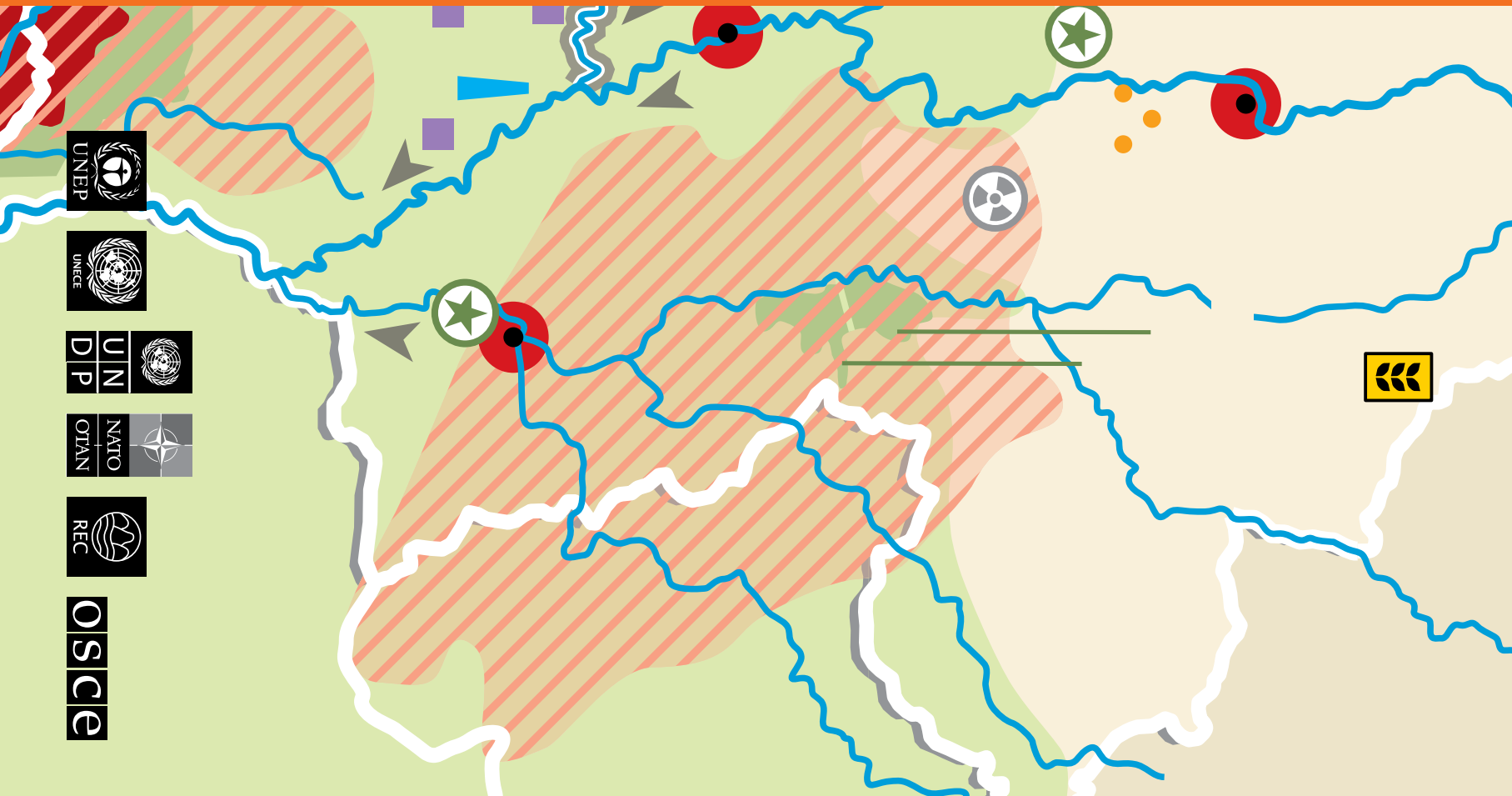
The case of Eastern Europe
Belarus – Moldova – Ukraine

Environment and Security

Transforming risks into cooperation



The United Nations Environment Programme (UNEP), as the world's leading intergovernmental environmental organisation, is the authoritative source of knowledge on the current state of, and trends shaping the global environment. The mission of UNEP is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.

The United Nations Development Programme (UNDP) is the UN's Global Development Network, advocating for change and connecting countries to knowledge, experience and resources to help people build a better life. It operates in 166 countries, working with them on responses to global and national development challenges. As they develop local capacity, the countries draw on the UNDP people and its wide range of partners. The UNDP network links and co-ordinates global and national efforts to achieve the Millennium Development Goals.

The United Nations Economic Commission for Europe (UNECE) strives to foster sustainable economic growth among its 56 member countries. To that end UNECE provides a forum for communication among States; brokers international legal instruments addressing trade, transport and the environment; and supplies statistics and analysis. The broad aim of UNECE's environment activities is to safeguard the environment and human health, and to promote sustainable development in its member countries in line with Agenda 21.

With 56 participating States, **the Organization for Security and Co-operation in Europe (OSCE)** is a pre-eminent instrument for early warning, conflict prevention, conflict management and post-conflict rehabilitation in continental Europe, the Caucasus, Central Asia and North America. Since its beginnings in 1973 the OSCE has taken a comprehensive view of security, including through the protection and promotion of human rights and fundamental freedoms, economic and environmental cooperation, and political dialogue.

The Regional Environmental Centre for Central and Eastern Europe (REC) is a non-partisan, non-advocacy, not-for-profit international organisation with a mission to assist in solving environmental problems in Central and Eastern Europe. The centre fulfils this mission by promoting cooperation among non-governmental organisations, governments, businesses and other environmental stakeholders, and by supporting the free exchange of information and public participation in environmental decision-making.

The North Atlantic Treaty Organisation (NATO) embodies the transatlantic link that binds Europe and North America in a unique defence and security alliance. In response to recent changes in the overall security environment, NATO took on new fundamental tasks. These include addressing both instability caused by regional and ethnic conflicts within Europe and threats emanating from beyond the Euro-Atlantic area. NATO's "Science for Peace and Security" programme brings scientists together to work jointly on new issues and to contribute to security, stability and solidarity among nations.

ISBN: 972-82-7701-044-1

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and the participants in ENVSEC country consultations in Chisinau, Kyiv and Minsk in May and June 2006.

Language editing: Harry Forster (Interrelate, Grenoble).
Maps and graphics: Viktor Novikov, Emmanuel Bournay (UNEP / GRID-Arendal).
Design and layout: UNEP / GRID-Arendal

Editorial and project manager: Nickolai Denisov (UNEP / GRID-Arendal).

The governments of Canada, the Netherlands, Belgium and Norway, and the "Science for Peace and Security" programme of the North Atlantic Treaty Organisation have provided financial support for the assessment and for the preparation and publication of this report.

Printed on 100% recycled paper at Imprimerie Nouvelle Gonnet, F-01303 Belley, France

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Contents

Preface

The start of the twenty-first century witnessed dramatic changes in the global security situation and public awareness. The familiar world of superpower politics, and military checks and balances gradually gave way to a world of smaller but omnipresent threats, multi-polar interests and situations for which military power is not a suitable or effective response.

These threats include environmental degradation or scarcity, affecting people and countries alike. It speaks for itself that politicians and the media all over the world should now cite climate change as one of the largest security problems. Disputes over environmental issues seldom ignite conflicts directly, but they can fan the flames. Moreover conventional, twentieth century "fire-fighting" tends to treat the environment as nothing more than collateral damage. To break out of this vicious circle demands new approaches and new thinking.

ENVSEC partner organisations see this assessment report as a tool for catalysing debate and action in the Eastern European region. Its conclusions, besides summarising the overall picture, outline future work that ENVSEC can carry out together with Eastern European countries. We hope, in this way, to help the region meet security goals and challenges through, and in combination with, stronger and effective environmental protection and enhanced cooperation.

Note on the use of geographic names

For the purpose of this paper, the names of geographic objects located within Belarus, Moldova or Ukraine are transliteraterated to English, respectively, from Russian, Moldovan, and Ukrainian. Soft consonants are not indicated by an apostrophe (*Lviv*, not *L'viv*). In transliteration from Moldovan, diacritic signs are omitted.

For geographic objects in other countries, shared by several countries (e.g. the *Dniester, Polesie, Carpathian mountains*), or widely known internationally with their traditional English spelling (*Chernobyl*), preference is given to the latter.

The Environment and Security initiative (ENVSEC)

The Environment and Security initiative was launched in May 2003 simultaneously at the 5th Environment for Europe ministerial conference in Kyiv and the OSCE Economic Forum in Prague, by three international organisations with different while complementary agendas and missions: the UN Environment Programme (UNEP), the UN Development Programme (UNDP) and the Organization for Security and Co-operation in Europe (OSCE). Now in 2007, the initiative has been joined by the UN Economic Commission for Europe (UNECE), the Regional Environmental Centre for Central and Eastern Europe (REC), and the Public Diplomacy Division of the North-Atlantic Treaty Organisation (NATO) as an associated partner.

From the outset ENVSEC has seen its primary goal as helping countries identify, understand and where possible mitigate risks to stability and security that may stem from environmental problems and challenges. Likewise it aims to promote more sustainable solutions to security challenges by addressing their environmental aspects. The initiative aims to contribute to solving existing or emerging political disputes by improving dialogue and promoting co-operation on environmental issues throughout the pan-European region. Assessments in South-Eastern Europe and the Southern Caucasus have so far led to a much broader, deeper and more concrete understanding than before of how environmental and security concerns and policies intervene and affect each other. ENVSEC analyses and maps are known and used at schools and universities, in public debate and governmental planning. Projects on the ground range from in-depth investigations of hotspots[1] and awareness-raising to helping countries strengthen their institutions, improve policies and find solutions to concrete problems in the environment-security domain.

The ENVSEC assessment in Belarus, Moldova and Ukraine started at the request of their Governments in 2005. Research through academic literature, statistics and other documents, discussions within countries and partner organisations, and inputs commissioned from national experts provided an initial picture of issues and specific areas where various environmental and security concerns overlap, and possible actions in individual countries, communities and the region. Broad national consultations with governmental authorities, research and international organisations and public groups in Chisinau, Kyiv and Minsk in May-June 2006 helped achieve a much more comprehensive understanding of various actors' views on the environment and security challenges, and of the broad range of their actions and intentions in the field. The latter helped ENVSEC to discuss and develop plans that would fill existing gaps in the big picture rather than compete with others.

For further information, see www.envsec.org.

Linkages between the environment and security

The end of the Cold War coupled with global concerns over human rights, human development and environmental risks opened up a debate over new threats that could orient security, environmental and related policies in mutually reinforcing ways. Although never the sole causal factor, the contribution of environmental issues, especially resource scarcity, to conflicts has been a central pillar of the discussion centring on the environment and security. This has led to consideration of the capacity of states to deal with issues of scarcity and competition over resources, as well as the effects on security of migration due to environmental and resource factors. It has also been recognised that the links between environment and security mean that security can be improved through environmental cooperation (Homer-Dixon 1999).

The internationally discussed relationship between the environment, and security challenges and policy is consequently complex and multi-dimensional. The ENVSEC initiative has made a substantial contribution to this discussion in its recent publications on the Balkans, Central Asia and the Southern Caucasus[2], clarifying in particular the role of environment-security interactions under the specific conditions of countries undergoing economic, and political transition.

The present report considers three different aspects of this relationship particularly relevant to Eastern Europe:

- **Security implications of environmental problems** – situations in which scarcity and degradation of natural resources or environmental hazards increase the risk of tensions and exacerbate external and internal security challenges;

- **Improving security through environmental cooperation** – cases in which environmental cooperation might alleviate existing tensions, and foster stability and mutual trust;

- **Environmental implications of security measures** – circumstances in which security policies and measures have significant environmental implications and require special attention from this perspective.

Security implications of environmental problems

The current consensus is that existing tensions between and within states due to non-environmental factors can be exacerbated by environmental degradation, competition over natural resources as well as real and perceived environmental hazards. Environmental factors aggravate such tensions if they contribute to an atmosphere of hostility and distrust between states or communities. For example, poorly managed stockpiles of hazardous chemicals and dangerous activities (e.g. chemical industries, nuclear power plants, and mining activities) near international frontiers and transboundary water bodies can put a strain on inter-state relations.

The effects of environment-related factors on tension and conflicts depend on specific local conditions. For example, scarcity of natural resources and environmental goods plays an important role in conflict. Such scarcity may be absolute (where there are not enough resources) or relative (where some groups such as ethnic minorities or rural populations are denied fair access to resources). Thus, social processes that regulate access to natural resources as well as a population's vulnerability may amplify or reduce the effects of environmental factors on conflict potential (Baechler 1998, 1999; Homer-Dixon 1999, ICG 2002).

Environmental problems affect not only the probability of conflicts, but also other aspects of security, such as political and social stability, and the running of state and social institutions. For example, unsustainable use of resources or environmental degradation undermine rural or regional economies, and

human health, and induce unsustainable migration[3]. Government budgets may be burdened by the costs of environmental clean-up and remediation measures. Unfavourable demographic trends related to environmental factors (a sharp rise or decline in population, deteriorating health, mass migration) as well as a rapid decline in economic welfare threaten social and political stability. International research has shown that under certain conditions this may disrupt social institutions and even lead to "state failure" (Esty et al. 1999). Young and emerging nations are especially vulnerable to such challenges, though most countries in Europe and North America have had to cope with them to some extent.

Improving security through environmental cooperation

Whereas environmental problems may aggravate security challenges, protective counter-measures, particularly when they are implemented cooperatively, may help to alleviate them. Cooperation over the environment, including joint management of water resources and dialogue on transboundary hazards can help reduce international tension. Environmental cooperation in relatively low-tension areas, such as the establishment of jointly managed conservation zones (for example "peace parks") can also raise the level of trust between states or communities, thereby contributing to overall stability (Dabelko and Conca 2002). Another important area of such cooperation within the security framework is the development of legal regimes and institutions for information sharing and early warning to anticipate accidents and promote dialogue (Weinthal 2004).

Proper environmental policies can also help to solve non-conflictual security challenges. Reversing environmental degradation and eliminating hazards may help to slow or halt unsustainable migration. Environmental protection and restoration activities may strengthen institutions underpinning overall social stability. For example, properly designed environmental policies[4] may stimulate local agricultural production and other countryside activities and therefore contribute to rural development and reduce food dependency.

Environmental implications of security measures

Security policies and measures may have positive or negative impacts on the environment. For example, military activities and facilities often present risks for the environment and human health. Restructuring or decommissioning such activities or facilities may reduce or increase such risks depending on whether proper consideration is given to environmental factors.

Another example is energy policy, an area in which the stakes for both the environment and security are very high. The drive towards energy security and away from acute energy dependence can have positive or negative environmental effects, depending on the choice of resources, solutions and energy technology. Facilitating innovative energy solutions and improving energy efficiency may simultaneously increase energy security and reduce environmental impacts. Conversely, hasty introduction of environmentally unsustainable or hazardous energy technologies may be only a temporary solution to energy security while at the same time imposing numerous new risks on the society.

In summary, integrating environmental considerations into sectoral policies, such as security, defence, energy and foreign affairs, increases scope for addressing overlapping environmental and security concerns and improves the climate of intersectoral policy-making in these areas.

Eastern Europe: the regional context

Belarus, Moldova and Ukraine – referred to in this report as Eastern Europe[5] – are nations with recent sovereign statehood. They are positioned between an enlarging European Union and a historically influential Russia. The area's unique position and history have played a large part in the overlapping of environmental and security issues, which have evolved over three distinct periods: the Soviet years of intensive industrialisation, a difficult period of political and economic transition, and the recent economic recovery with its new challenges.

Following the sudden disintegration of the USSR, Belarus, Moldova and Ukraine immediately faced a historic challenge for which they were ill equipped. Outsiders often fail to appreciate their problems but are quick to notice poverty, corruption and other negative phenomena in Eastern Europe. Despite these challenges the three countries have achieved significant successes. The region has negotiated the difficult transition years without suffering violent conflict of the kind that paralysed the Balkans, the Caucasus, and Central Asia. Eastern Europe gained much sympathy by deciding not to preserve military nuclear capacity and transfer weapons inherited from the Soviet Union to Russia[6]. Furthermore disagreements between Russia and Ukraine regarding the status of the Soviet Black Sea fleet have been satisfactorily managed and largely resolved, sparing Europe a major security risk. However there are plenty of regional security issues reaching beyond the borders of Eastern Europe to feature on the security agenda of the whole continent. The Transnistrian conflict in Moldova is one example. Difficult are also issues of supply and transit of Russian fuel. The key challenge for the three countries is still to strengthen contemporary state institutions, so that they can fully address economic, social, demographic, environmental and security problems.

The legacy of the Chernobyl disaster – almost synonymous for the outside world with environmental problems in Eastern Europe – epitomises the difficulties involved in dealing with all these problems at the same time. In the early hours of 26 April 1986 a violent explosion at the Chernobyl nuclear power plant, near the Ukrainian-Belarusian border, destroyed the reactor and started a large fire that lasted 10 days. During the explosion and the fire a huge amount of radioactivity was released into the environment, spreading over hundreds of kilometres into Belarus, Ukraine and beyond. The authorities' secrecy and initially incompetent response aggravated the situation and contributed to the largely uncontrolled exposure to radiation of the nearby population and safety workers. For the last 20 years millions of Ukrainians and Belarusians have been living on contaminated land. Compulsory resettlement out of the more dangerous areas shattered the lives of hundreds of thousands. Many more chose to voluntary abandon the environmentally unsafe and economically depressed region. Its mounting health problems and a catastrophic demographic situation were compounded by accelerating outward migration by young and able people. Prohibitions pervade the everyday lives of a whole generation of people still living in the contaminated areas. They can never again graze their cattle on meadows, pick berries and mushrooms in surrounding forests or till their own fields.

Chernobyl affected one-fifth of Belarus territory and a quarter of its population. In the early 1990s as much as 20% of the national budget was spent on remediation efforts, which would result in economic meltdown even in a stable, healthy economy. The economic, social and environmental burden of Chernobyl was no lighter in Ukraine, which had to deal with the safety of the destroyed reactor as well. The disaster also clearly demonstrated that an accident in one country may threaten human lives and health all over a continent. In the USSR and former Soviet states Chernobyl not only became a rallying point for many of the social movements, eventually contributing to the collapse of the Soviet

Political patterns and communication axes

Map by UNEP/GRID-Arendal, May 2007.

Geopolitical position

- Borders of EU member-states
- Borders of the Russian Federation
- Russian military bases / facilities in Eastern European countries
- Past / current (frozen) conflicts

Land and territorial disputes

- Inter-state disputes in the process of international or bilateral resolution
- Inter-ethnic disputes

Transportation axes

- Major corridors
- Secondary corridors

Source: Belarus State University. *Atlas of Belarus Geography*. Minsk 2005; State Committee for Land Resources, Geodesy and Cartography. *National Atlas of Belarus*. Minsk 2002; Botnaru V. and O. Kazantseva. *Republic of Moldova. Atlas*. Chisinau 2005; State Committee for Natural Resources. *Integrated Atlas of Ukraine*. Kyiv 2005. ENVSEC consultations 2006-7.

system, but also influenced contemporary political regimes by shaping the relationship between its victims and the state[7]. Twenty years after the disaster the influential Blacksmith Institute (2006) still lists Chernobyl among the 10 most polluted places in the world.

Given this legacy, the recent announcements of plans by the governments of Belarus and Ukraine to expand the use of nuclear power reflect the dramatic challenges facing these countries. Their current dependence on energy imports is seen as one of the key security concerns. The region does not have sufficient energy resources of its own, but energy is critically important for both social stability and economic development, particularly with such high energy-intensity economies. The energy issue is all the more important because Eastern Europe stands at the crossroads of east-west and north-south energy corridors linking Russia to Western Europe, and the Black Sea to the Baltic.

The quest for secure energy supplies by whatever available means may have serious implications for the environment in Eastern Europe, already up against acute problems. While some of these are inherited over from the Soviet era, others are caused by the decline in state control during the transition years. A third category are related to the recent economic upturn and newly spurring industrial activities. Serious environmental issues facing the region include pollution in industrial and mining regions, accumulation of toxic waste, land degradation, and scarcity of safe drinking water. But at the same time the region has significant natural resources which, if wisely used, may support its long-term economic prosperity.

Geography, history and society

Eastern Europe extends from the northern shore of the Black Sea in Ukraine up to the Baltic Sea basin in Belarus. It covers 845,000 square kilometres and is home to almost 60 million people. These nations share common borders, watersheds, and infrastructure and have many similarities in their geography, history, culture and economy.

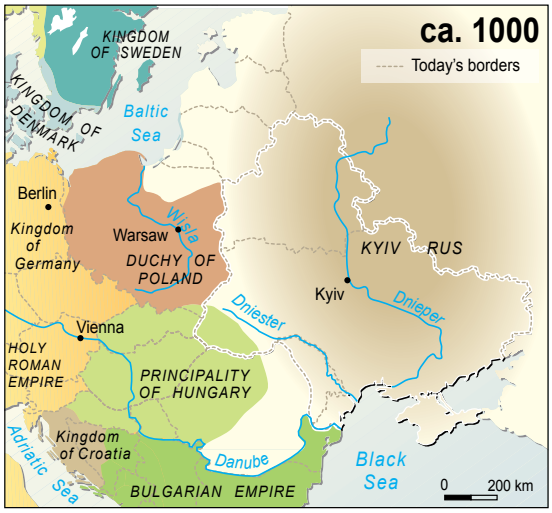
The region's eastern boundary roughly corresponds to the Dnieper watershed, and its western and south-western boundaries are loosely defined by the Z. Bug, Prut and Danube rivers as well as by the Carpathian mountains. Roughly speaking, the Dniester river separates Moldova from Ukraine and the Pripyat marshlands in Polesie divide Ukraine and Belarus. Most of the region consists of plain and lowland, wooded as in Belarus and northern Ukraine, or open steppe as elsewhere. The relatively small mountain regions are concentrated on the edges of Eastern Europe: in the Carpathians and Crimea.

The borders separating Belarus, Moldova and Ukraine, all of which were Soviet republics before 1991, follow former Soviet largely administrative divisions. The same is true of the region's eastern border with Russia and the northern border with Latvia and Lithuania. But all these borders also reflect pre-Soviet historic realities. For example, the eastern border roughly corresponds to the early modern frontier between Russia and the Commonwealth of Both Nations[8]. The contemporary Ukraine-Belarus border follows the administrative frontier between the Polish Kingdom and the Grand Duchy of Lithuania within this Commonwealth. The same ancient frontier separates present-day Belarus from Poland and is also known as the Curzon line[9], which divides Poland and Ukraine further south. The border between Ukraine and Moldova roughly reflects the Eastern border of the Ottoman empire in the 16th-18th century.

Eastern Europe through history

Source: Snyder T. *The Reconstruction of Nations. Poland, Ukraine, Lithuania, Belarus. 1569-1999*. New Haven & London 2003; Euratlas (www.euratlas.com).

Maps by UNEP/GRID-Arendal, May 2007.



Topography

Map by UNEP/GRID-Arendal, May2007.

Bathymetry ← | Altitude in meters →

-2 000 -1 000 -500 -100 **0** 50 100 200 500 1 000

Source: National Oceanic & Atmospheric Administration. World Data Center for Marine Geology & Geophysics. Gridded global relief data (ETOPO2); ESRI Inc. Global elevation digital data. Redlands, California. Data processing by UNEP / DEWA / GRID-Europe.

Forest cover

Map by UNEP/GRID-Arendal, May2007.

Source: United Nations Environment Programme - World Conservation Monitoring Centre. Forest cover digital data (www.unep-wcmc.org/forest/). Data processing by UNEP / DEWA / GRID-Europe.

Water basins of Eastern Europe

Map by UNEP/GRID-Arendal, May 2007.

Sources: Belarus State University. *Atlas of Belarus Geography*. Minsk 2005; State Committee for Land Resources, Geodesy and Cartography. *National Atlas of Belarus*. Minsk 2002; Botnaru V. and O. Kazantseva. *Republic of Moldova. Atlas.* Chisinau 2005; State Committee for Natural Resources. *Integrated Atlas of Ukraine*. Kyiv 2005.

An important feature of Eastern Europe is that it lacks prominent natural barriers both inside individual countries and between them and neighbours to the north, west and east. Historically this often made the area a literal or figurative battlefield first between eastern nomads and settled European cultures and more recently between the great powers of Russia and Europe. Western Christianity (Roman Catholic or Protestant) shaped the cultures to the north and west of Eastern Europe, developing in close connection with Western and Central Europe. The Eastern Christian (Orthodox) tradition fashioned society in the east of the region, connecting it to the culture of the vast expanses of northern Eurasia. The southwest of Eastern Europe bordered the Byzantine and Ottoman spheres of influence.

The region's borderline position has determined its many specific features. Neighbouring cultures deeply penetrated and influenced Eastern European societies, shaping contrasting developmental orientations. Eastern European lands changed hands many times in history and in some periods they were split between Western and Eastern powers. This happened, for example, in the 17th and 18th century when Ukrainian land on the left bank of the Dnieper belonged to Russia and on the right bank – to the Kingdom of Poland with the sovereign Ukrainian-Kozak state in the southeast of the country. In the 19th century Western Ukraine was part of the Austro-Hungarian Empire, whereas the rest of modern Ukraine belonged to the Russian Empire. The Ukraine People's Republic (1918-22) and Belarusian People's Republic (1918-19) were important milestones for sovereignty in the history of both countries. Later, in the 1920s and 1930s Eastern Ukraine and Belarus were part of the Soviet Union and consequently underwent rapid collectivisation and industrialisation, whereas Western Ukraine and Belarus were part of the Polish Republic. Moldova, except Transnistria, was part of Romania. This complicated the search for national identity and led to a duality of national cultures and national "political projects" attempting to strike a balance between East and West. In particular the penetration of different cultures from East and West[10] defined "cultural gradients" within the societies partly determining, for example, the present ambivalence towards European integration.

Eastern Europe suffered enormously from the major upheavals of the twentieth century. The two world wars, the civil war after the collapse of Tsarism, Stalinist repression and Nazi genocide claimed millions of lives in Ukraine, Belarus and Moldova. Ukraine particularly suffered from the severe artificially caused Holodomor (the famine) in 1932-3 that claimed millions of lives and whose social, psychological and demographical consequences still influence the country. In the light of this troubled past, the transition away from the Soviet system was remarkably peaceful, particularly considering the difficulty of accomplishing social, political and economic change on shrinking resources.

When the Soviet Union disintegrated in 1991, Belarus, Moldova and Ukraine urgently needed to modernise their economy to meet the new challenges of international competition, but lacked the resources (particularly private capital) necessary for the task. They also had to rise to the challenge of reconstructing state bodies, often aspiring to Western political models but building on what remained of a Soviet republic's government. In Moldova this task was further complicated by the Transnistrian conflict, whereas in Ukraine and Belarus the Chernobyl legacy hampered transformation. Moreover, in contrast to Central Europe and the Baltic states, Eastern Europe had to undertake its reforms without the major stimulus of possible EU membership and correspondingly massive technical and financial support. The situation has not been made easier by the fact that various players – neighbours, other influential states and supranational organisations – often have had divergent views on the desirable future of Eastern Europe.

The geopolitical position

Despite common borders and many similarities, the three countries of Eastern Europe do not constitute a region in the sense of political community. Belarus, Moldova and Ukraine have not yet developed visible capacity and projects for regional integration. On the contrary, Eastern Europe is a zone of geopolitical attraction among major powers, including the Russian Federation to the east, and the European Union to the west. Eastern Europe's pivotal location at the intersection of strategic transport corridors, such as between Russian and Caspian producers of fuel and European energy consumers, further amplifies such influence.

After expanding eastwards over the last decade, the EU seems to be experiencing "enlargement fatigue". Its capacity to absorb additional members was compromised, in particular, by the failure in 2005 to ratify a new European constitution[11]. Yet Eastern Europe borders seven of the new EU member states (Latvia, Lithuania, Poland, Slovakia, Hungary, and Romania) and watches over the Union's longest land border[12]. The EU is also the most important trade partner for all three countries. It is therefore still important for the EU to have friendly, politically stable and economically prosperous countries on its doorstep, forming a solid bulwark against unwanted migration, terrorism and other threats such as drug, arms and human trafficking (Ukraine and Moldova are the only two European countries among the "top ten" sources of illegal migrants to the EU)[13].

EU's most comprehensive attempt to deal with Eastern Europe is through its Neighbourhood Policy (see box) which aims at strengthenning stability in the region and cross-border cooperation.

On the eastern side, Eastern European countries must forge new relations with Russia with which they share strong historic, cultural and social ties. Russia is keen to maintain secure transit routes through Eastern Europe while retaining the ties of the past and developing political and economic cooperation. Travel to and from Russia is still visa-free. Simplified border regulations and cultural affinity facilitates transfers from several million Eastern European migrant workers in Russia, and other economic ties. Russia remains a key market for Eastern European products and the most important energy supplier for all three countries. As is the case with the EU, this economic cooperation makes relations with Russia extremely important, and political disagreements – for example regarding the settlement of the Transnistrian conflict in Moldova – very painful. Russian security interests are also related to the presence of its military facilities in Belarus, Moldova (Transnistria) and Ukraine (Crimea).

Since the disintegration of the USSR various international bodies involving part of post-Soviet states have been set up. The first of these, the Commonwealth of Independent States (CIS) was established in 1991. The CIS currently includes 12 former Soviet republics, while Turkmenistan has been an associated member since 2005. Among further initiatives the most notable was the Collective Security Treaty signed in Tashkent in May 1992 between all CIS countries excluding Moldova, Turkmenistan and Ukraine[14]. An economic integration initiative, the Eurasian Economic Community (EurAsEC), was started in 2000 and currently involves six former Soviet republics (including Russia and Belarus) as members, and Ukraine and Moldova as observers. EurAsEC aims to offer free trade, a common customs policy and, in the long term, monetary union. Finally, Russia has a close association with Belarus reflected in the Treaty of the Formation of a Union State, signed in 1996. Also notable in the region is the Organization for Democracy and Economic Development – GUAM, which includes Azerbaijan, Georgia, Moldova and Ukraine.

EU Neighbourhood Policy

The Neighbourhood Policy emphasises political and economic interdependence between the Union and its immediate neighbours (Eastern Europe and South Mediterranean) with which the enlarged EU will have "important shared interest in working together to tackle transboundary threats – from terrorism to air-borne pollution". The goal of the Policy is **"to avoid drawing new dividing lines in Europe and to promote stability and prosperity within and beyond the new borders of the Union".**

The Policy has been actively applied to Ukraine, and, increasingly, Moldova. After 2004, relations between Ukraine and the EU became closer, and they have now signed an EU-Ukraine Action Plan that envisages continued democratisation in Ukraine; enhanced security cooperation ; and approximation of Ukrainian law with EU regulations. The EU and Moldova have also agreed on an Action Plan that provides for closer links between the two, a more active role for the EU in settling the Transnistrian conflict, and promotion of sustainable development in Moldova, among others. The EU has signed partnership and cooperation agreements with all three countries in the region, although the agreement with Belarus has not come into force.

The environment is a high priority for the Neighbourhood Policy, which states that environmental protection "can help to avoid conflicts over scarce resources" and urges regional cooperation on environmental issues. In 2006 the EU announced that it would allocate €1.6 million to environmental sustainability projects in border municipalities in Belarus, Moldova, Ukraine, Russia and Georgia.

Source: European Commission 2004; europa.eu.int/comm/world/enp/index_en.htm for links to all aspects of the EU Neighbourhood Policy. The Economist, 26 October 2006

Peoples of Eastern Europe

Locally in the majority

- Belarusians
- Ukrainians
- Moldovans
- Russians
- Gagauz
- Poles
- Hungarians
- Romanians
- Bulgarians
- Lithuanians

Significant proportion

- Crimean tatars

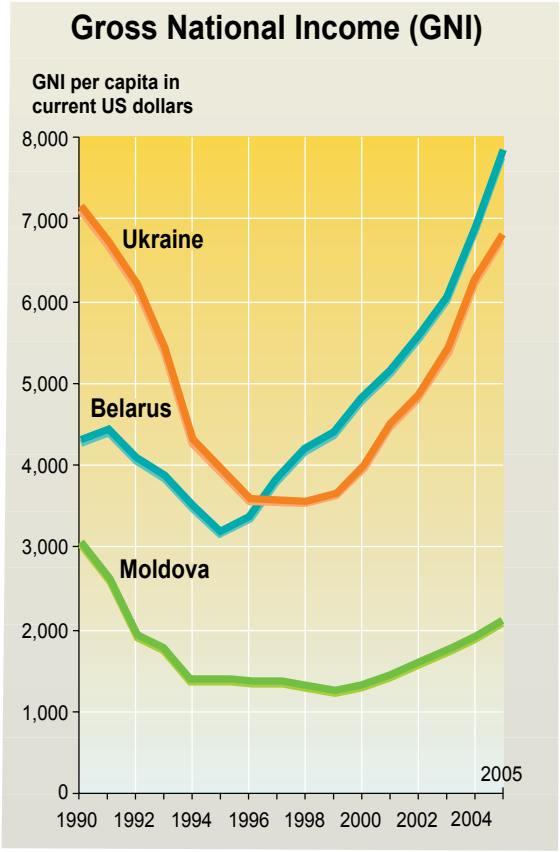
Map by UNEP/GRID-Arendal, May 2007.

Sources: State Committee for Land Resources, Geodesy and Cartography. *National Atlas of Belarus*. Minsk 2002; State Committee for Natural Resources. *Integrated Atlas of Ukraine*. Kyiv 2005; Moscow Ethnographic Institute, 1995 in Marin C. *Atlas des minorités européennes*. Paris 2005; Rekacewicz P. in *Atlas du Monde Diplomatique*, Paris 2006.

Internal security challenges

Internal problems and tensions are no less important than geopolitical challenges. Not only may they weaken young states and increase their vulnerability to external factors[15], but they may also present security challenges in their own right. Not surprisingly such internal security factors feature prominently in the national security doctrines of all three countries.

Many of the internal developments are common to other post-Soviet states. Though expanding, the region's economies still lag behind most of their neighbours, with Moldova one of the poorest European countries in terms of per capita GDP. All the countries suffered economic decline in the 1990s followed by some recovery over the last five to ten years (see GNI figure). However, this recovery has gone hand-in-hand with painful economic restructuring. In the past Belarus, Ukraine and Moldova were intricately linked to the rest of the Soviet economy. The collapse of the USSR and economic liberalisation opened up local markets, increased competition and severed some of the ties with former Soviet republics. However access to Western markets, especially in the EU, has been very limited and often conditional on political or further economic reform. Moreover the new patterns of trade with Europe have increasingly consisted of exports of raw materials in exchange for imports of manufactured goods. Finally it has proven difficult to restructure the old heavy industry which was often the mainstay of the Soviet-era economy.



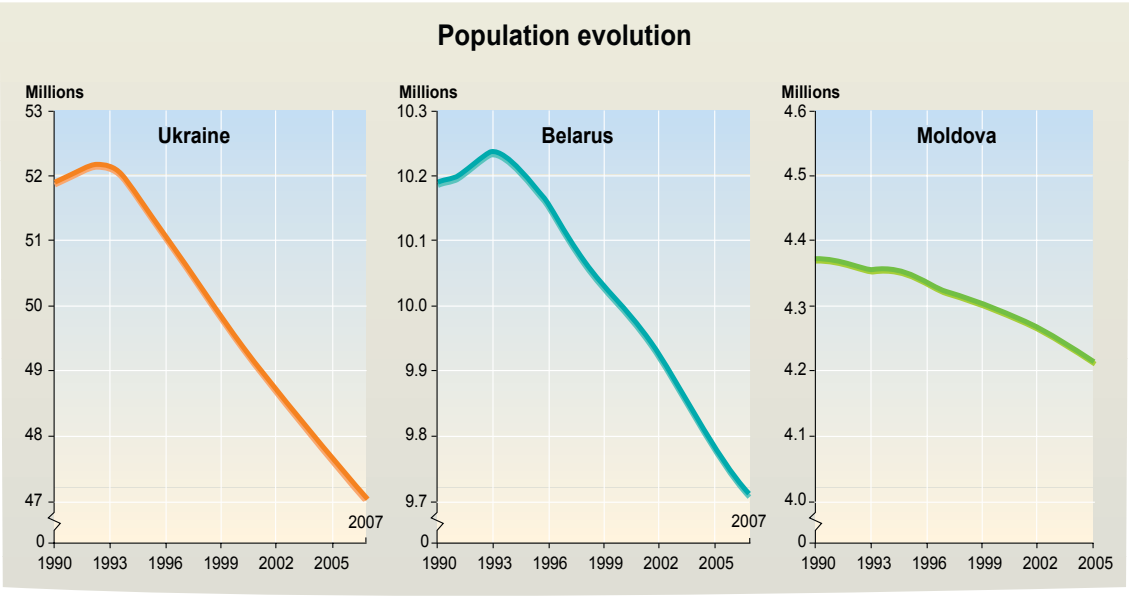
UNEP/GRID-Arendal, May 2007.

Note: Purchasing Power Parity method.
Source: World Bank. Development Indicators database (www.worldbank.org).

Selected economic, social and environmental indicators in Eastern Europe

	GDP / capita (PPP USD), 2006*	Human Development Index (2006, rank)**	Corruption Perception Index 2006 (rank) ***	Environmental Sustainability Index (rank)****	
				2002	2005
Belarus	7,716	67 of 177	151 of 163	49 of 142	47 of 146
Moldova	2,377	114 of 177	79 of 163	39 of 142	58 of 146
Ukraine	7,803	77 of 177	99 of 163	136 of 142	108 of 146

Source: * - IMF (2007); ** - UNDP (2007); *** - Transparency International (2007); **** - Esty et al (2005)[16].



Note: The vertical scale for each graph is different.
Source: World Bank. Development Indicators database (www.worldbank.org); CIS-STAT. Population data for 2006-2007 (www.cisstat.com).

UNEP/GRID-Arendal, May 2007.

Key demographic indicators in Eastern Europe

	Population, million		Fertility rate, ***	HIV infection % adults****
	2005	2050 projection		
Belarus	9.8*	6.96*	1.39	0.3
Moldova	4.33**	3.62**	1.81	0.2
Ukraine	46.5*	30.9*-37.7**	1.16	1.4

Sources: * - UNPD (2007); ** - U.S. Census Bureau (2006); *** - CIA (2006); **** - UNAIDS (2005).

Economic restructuring has consequently not delivered on its promise of universally higher living standards and political stability. The decline in agricultural production contributed to increased poverty and further deterioration in the basic infrastructure of rural areas in all three countries. Social problems have also become more acute in some heavily industrialised regions. In certain cases this has coincided with tension and conflict. Here again, the most striking example is Transnistria, home to almost all Moldovan industry with traditionally strong ties to the former Soviet economic space. Another example of a region suffering from economic restructuring is the heavily industrialised Donbas region in Ukraine where economic and social problems mesh with issues of environmental and energy security.

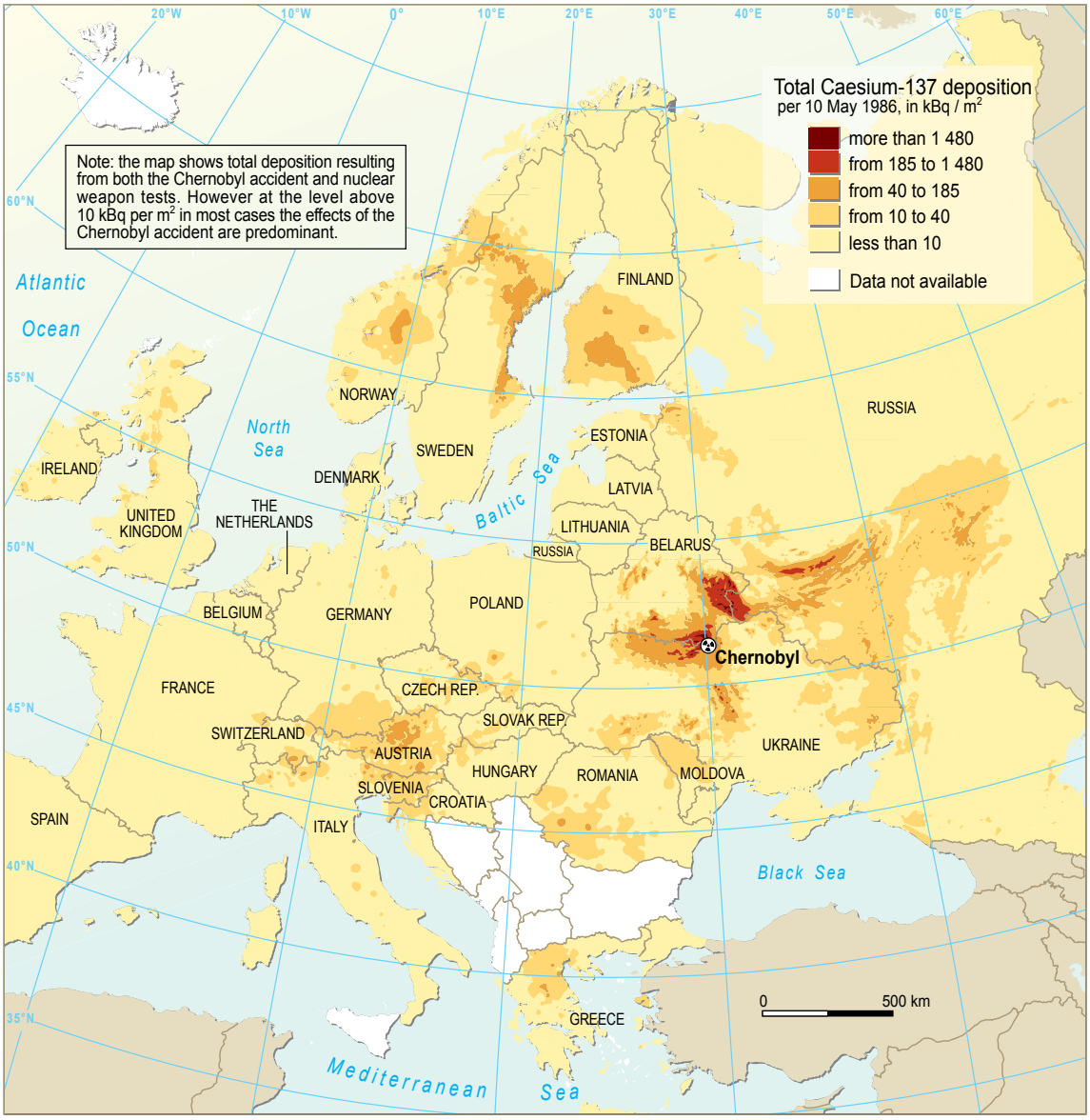
The economic and social problems of rural and heavily industrialised areas are aggravated by demographic trends, severely affected by the declining birth rate, now below the replacement level in all three countries. The populations of Ukraine and Belarus will shrink significantly, with Ukraine expected to lose 9 to 15 million people over the next 50 years (see population figure). Outgoing labour migration makes the situation even worse, hitting Moldova particularly hard, with an estimated 600,000 to 1,000,000 Moldovans (i.e. 40% of the active population) working abroad.

Other serious, in some cases severe, problems include the spread of HIV/AIDS and tuberculosis. The rate of increase in HIV/AIDS infections in the region is among the highest in the world, though significant differences between the countries have been reported. Ukraine, with an adult infection rate of 1.4%, is the hardest hit country in Europe (UNAIDS 2005). The governments of the three countries are making a considerable effort to attract international attention and obtain assistance in addressing this serious problem.

Coping with these difficulties requires effective, resourceful and committed state government. However, government bodies in the region are not always able to implement reform of social welfare, health care and education. They themselves are often in need of reform, to effectively deal with public sector corruption, for example[17].

As already pointed out, internal and external security challenges are closely linked. On the one hand internal weaknesses increase vulnerability to external threats, and on the other hand external pressures often shape economic and political reforms with their social, environmental and other security repercussions. Energy, among other issues, is at the core of both internal and external security challenges in the region.

The continental scale of the Chernobyl accident



Map by UNEP/GRID-Arendal, May 2007.

Source: European Commission, Joint Research Center, Environment Institute; Institute of Global Climate and Ecology (Moscow); Roshydromet (Russia); Minchernobyl (Ukraine); Belhydromet (Belarus). *Atlas of Caesium Deposition on Europe after the Chernobyl Accident*.1998.

The energy dilemma and Chernobyl legacy

The overall impact of the Chernobyl disaster on Belarus and Ukraine, already mentioned at the beginning of this chapter, is described further in greater detail in the box. Given this tragic legacy, why are both Belarus and Ukraine currently considering expanding their nuclear energy generating capability? The answer lies in the special role played by energy, and energy security, in Eastern Europe.

Energy is vital for the internal and external security of all three countries (see figure). A secure, affordable domestic energy supply is critical to economic development, particularly in energy-hungry industrial sectors. It is also essential to meet social needs (heating, transportation, etc.) especially for vulnerable groups. Since the region's own energy resources and production capacities, especially in Moldova and Belarus, are insufficient, a significant proportion of energy has to be imported (see table), primarily from Russia. This is, in turn, a major factor in the external security of Eastern Europe. Another factor is the location of the region at the crossroads of major energy transport corridors linking producers in Russia and the Caspian region with consumers in Central, Western and Northern Europe. In the context of rising global demand for energy and higher hydrocarbon prices, the stability of oil and gas transportation routes is becoming increasingly important for Russia, the EU, the United States and other countries[19].

A good illustration of the external aspect of energy security was the heated debate over arrangements for the supply of Russian natural gas to Belarus and Ukraine, tariffs for transporting gas across these countries, and ownership of gas transportation facilities. Belarus, a traditional Russian ally, was purchasing Russian gas at $47 a cubic metre [20] until the end of 2006. From 2007, the price of the gas was increased to more than $100 a cubic metre. In the context of price negotiations, Belarus also agreed to sell 50% of shares of Beltransgaz – the Belarus national gas distribution and transportation company – to Russia's state-owned Gazprom. The dispute between Russia and Ukraine over gas prices in early 2006 resulted in disruption of gas supplies to Western Europe sparking a strong reaction from the EU that had worldwide resonance[21]. While most observers considered that Russia was exerting political pressure by increasing gas prices, others pointed out that before the 2006 deal Gazprom had been supplying Ukraine at a fifth of the market price, equivalent to Russia subsidising the Ukrainian economy by $3 to $5 billion a year[22]. A similar dispute over tariffs on export of Russian oil and its products to and through Belarus resulted in a brief disruption of oil supplies to Poland and

The Chernobyl legacy

The accident involving reactor meltdown and massive release of radioactivity occurred on 26 April 1986 at the Chernobyl nuclear power plant situated seven kilometres south of the Ukraine-Belarus border, at the confluence of the Pripyat and Dnieper rivers. Radioactive fallout affected not only Ukraine and Belarus, but also nearby Russia and countries as far away as Sweden and the UK. The Soviet authorities initially tried to conceal the true extent of the disaster, but then made unprecedented (and sometimes misguided) efforts to mitigate its consequences. After the collapse of the Soviet Union the burden of dealing with the catastrophe fell mainly on Ukraine and Belarus, two much smaller and newly independent states which did not have anything approaching adequate means to deal with the awful legacy.

In Ukraine, more than 350,000 inhabitants were resettled from over 2,000 locations in the contaminated zone. Several million others have lived on contaminated land since 1986. Between 5% and 7% of the state budget of Ukraine is currently spent mitigating the consequences of Chernobyl whereas in the early 1990s this figure was up to 10% and the total expenditure in 1991-2005 amounted to about $7 billion

In Belarus radioactive contamination has affected about a fifth of the territory and a sixth of all agricultural land. The cost to the economy is estimated as the equivalent of 32 to 35 times the state budget in 1985. In 1991 Belarus spent about 22% of its national budget on Chernobyl remediation measures. The figure dropped to 6% in 2002 and is now about 3%. Total spending by Belarus on Chernobyl between 1991 and 2003 exceeded $13 billion. Apart from direct health impacts, the social problems of Chernobyl in Belarus are related to the loss of rural livelihoods and outward migration by the qualified workforce, coupled with inward migration by people who usually have economic or social difficulties elsewhere. With a significant amount of farming land in the areas of major fallout still unsuitable for cultivation, development is a challenge, especially for small towns accommodating migrants from local rural communities and from the outside of the region (e.g. to Belarus from Central Asia). In Ukraine, about 6.7 million hectares of land have been contaminated by radioactive fallout from Chernobyl and more than 3 million people live on contaminated land.

The current level of government expenditure on compensatory payments is hardly sustainable. Meanwhile the direct health consequences have slowly given way to longer-term social marginalisation of the affected areas, and a number of national and international initiatives now focus on economic rehabilitation of the affected areas, ranging from traditional direct support to structural attempts to move the burden of recovery and development from states to communities and individuals. The 2002 Report to the UN General Assembly (UNDP and UNICEF 2002) characterised the situation in the affected communities as a “downward spiral” of deteriorating health, declining well-being and increasing environmental hazards. It identified numerous forms of interaction between environmental contamination, halted economic development, and the health and social crisis. This was further elaborated in 2005 in material submitted by the inter-agency Chernobyl Forum, also endorsed by the UN General Assembly in 2006. The latter reports prompted a controversial international response, regarding its alleged under-

estimate of the direct health impacts of radiation[18] and its excessive emphasis on psychological effects, fostering the misleading impression that the impacts of Chernobyl were largely imaginary and could be cured through some sort of or psychological help or social adaptation.

Radioactive pollution is still a concern in Chernobyl-affected areas. Whereas radioactive caesium and strontium, still widespread, are decaying, the plutonium will stay in the environment much longer. (Plutonium was deposited in a much smaller area, but is much more harmful if it enters the body.) There are substantial risks of transboundary spread of contamination: radioactive caesium and strontium are transported by the Pripyat river from Belarus to Ukraine and influence contamination levels in Ukrainian rivers. Plutonium, although insoluble in water, is carried away in dust and soot from recurrent forest and peat fires, in suspended solid particles during floods, and even in migrating wild animals (the wildlife population has substantially increased recently due to protection in part of the heavily polluted area, obliging animals to look for food elsewhere, often being hunted by local residents). Some plutonium isotopes decay into a more harmful, poorly studied isotope, americium, the concentration of which is consequently increasing. Contamination of the most severely affected areas is very uneven (with a ten-fold variation over a few metres) and constantly changing. In forests (including wildlife) and closed water bodies such as small humic lakes, radioactivity is expected to stay for decades, perhaps centuries. The issue of using less severely polluted areas for farming is further complicated by the fact that poor peat soils (e.g. in northern Ukraine) are generally characterised by a very high transfer rate of radionuclides from soil to plants. This makes the use of agricultural products problematic even if the level of radioactive soil contamination substantially decreases.

The situation requires continued scientific research and observation to minimise the impact of radiation and support safe socio-economic development of affected areas. On the Belarus side the most severely contaminated areas are part of the Polesskiy Radiation-Ecological Reserve which monitors radiation, the environment, flora and fauna. On the Ukrainian side, the evacuated territories are managed by a special administration which conducts more diverse management tasks but is not responsible for scientific observations. Scientific research in the Chernobyl “zone” is conducted by the Chernobyl centre for issues of nuclear security, radioactive waste and radio-ecology. For the time being there is little direct research cooperation between these authorities of the two countries.

In the course of remediation work, a substantial amount of radioactive materials and contaminated equipment accumulated in the evacuated and adjacent near-border areas. This, along with widely discussed plans to build a storage facility for radioactive spent fuel from Ukrainian nuclear industry beside the Chernobyl power plant itself, adds yet another dimension to the problem.

Sources: UNDP and UNICEF (2002), Nesterenko et al. (2002); The Chernobyl Forum (2005) and the TORCH Report (Farlie and Sumner 2006). Various other reports from the IAEA site at www-ns.iaea.org/appraisals/chernobyl.htm. Other publications discussing the health side of Chernobyl include: the International communication platform at http://chernobyl.info/ website which includes e.g. SDC (2006); Tourbe (2006); Boos (2006). Numerous official publications on Chernobyl were released to mark the twentieth anniversary of the disaster in April 2006, e.g. Comchernobyl (2006); TESEC (2006); Shevchuk and Gurachevsky (2006); Baloga (2006).

Energy resources, production and transportation

Major gas pipelines
(line thickness indicates pipeline capacity)

Major oil pipelines

Oil fields

Oil refineries
(operating / under construction)

Oil terminals
(in use / considered)

Main oil and gas areas

Gas fields

Gas processing plants

Underground gas storages

Nuclear power plants
(operating / projected / closed)

Major fossil fuel power plants

Major hydropower plants
(operating / projected)

Coal deposits

Uranium deposits

Peat deposits

Sources: INCOTEC. *Oil, gas and product pipelines of Russia and nearby states* and *Atlas. Fuel-energy complex of Russia XXI.* Moscow 2006; Lecarpentier A. *Underground gas storage in the world*, CEDIGAZ, 2006; Belarus State University. *Atlas of Belarus Geography.* Minsk 2005; State Committee for Land Resources, Geodesy and Cartography. *National Atlas of Belarus*. Minsk 2002; Botnaru V. and O. Kazantseva. *Republic of Moldova. Atlas.* Chisinau 2005; State Committee for Natural Resources. *Integrated Atlas of Ukraine.* Kyiv 2005. ENVSEC consultations 2006-7.

Imported energy is important to fuel economic development, particularly energy-hungry heavy industry, such as machine building and steel production in Ukraine and fertiliser and chemical production in Belarus. Refining of oil products in Mozyr and Novopolotsk used to be a key sector in the Belarus economy (Balmaceda 2006), but profits may drop substantially after Russia imposed tariffs on the export of oil to Belarus in January 2007. The survival of much of the metallurgy and machine-building industry in the Donbas depends directly on a cheap, secure supply of natural gas currently imported from Russia, or on finding an alternative such as electricity from Ukraine's domestic power sources. Most of heavy industries were inherited from the Soviet Union and are often located in environmentally and socially stressed areas, while forming the mainstay of the existing economy. It may not be economically feasible to restructure them to improve energy security. Moreover such industry is socially (and politically) important, as it constitutes the main source of work in densely populated areas with a poorly diversified economy.

There are many other ways in which energy is linked to social and ultimately political issues. Even with current tariffs often below cost-recovery levels, heat and electricity bills are a burden for poor people. In 2003 utility bills (primarily electricity) represented 37% of an average pensioner's income in Moldova (Fankhauser and Tepic 2005). Raising tariffs to cost-recovery levels may render heat and electricity virtually unaffordable for many.

Throughout the difficult 1990s, the energy supply in Eastern Europe remained relatively secure due to the slowdown in industrial activity and substantially under-priced imports of oil and gas from Russia and Central Asia. Recently energy demand in the region has reached and surpassed the 1991 level at the same time as the world oil prices have increased dramatically. Russia, for its part, has started a reappraisal of the political and economic costs and benefits of providing indirect energy subsidies. These factors are forcing the three countries to urgently rethink their energy supply options.

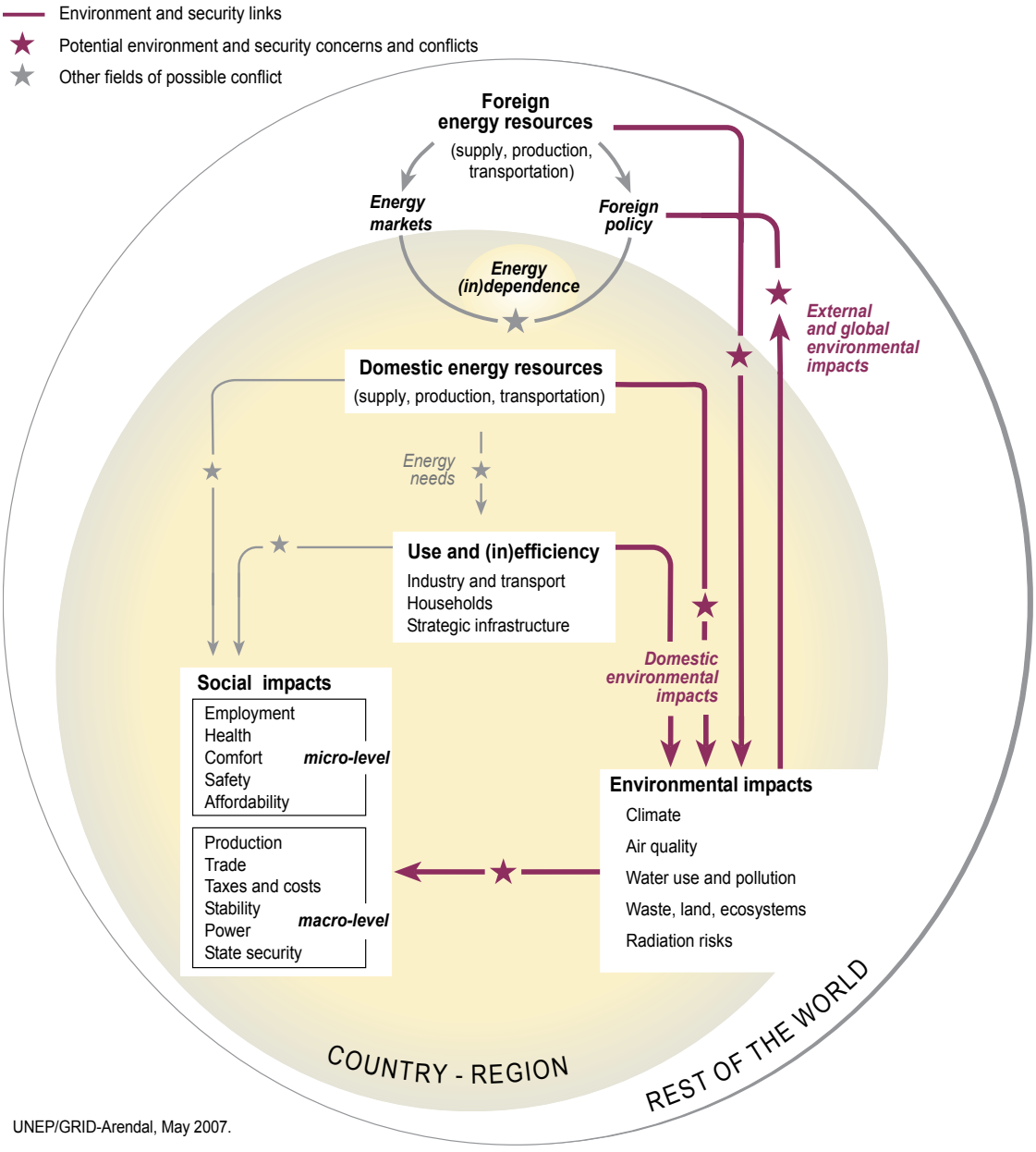
The need is so pressing that Belarus and Ukraine are turning to nuclear power to solve their energy problems. Belarus plans to build a domestic nuclear power plant by 2015, while the Energy Strategy adopted by Ukraine proposes new nuclear reactors and extending the service life of existing ones. This raises obvious technological challenges locating reactors and finding adequate water resources for cooling, particularly in Ukraine which is already short of water in many areas. But the deployment of nuclear power is also associated with various security challenges ranging from enforcement of non-proliferation to concerns about terrorism, the operation of reactors and radioac-

Energy Consumption in Eastern Europe

	Energy intensity of the economy (million TOE / $ billion)*	% of imports in energy balance*	Predicted affordability of basic utilities for poorest population in 2007**
Belarus	1.61	87%	13-30%
Moldova	2.01	97%	7-12%
Ukraine	3.19	46%	7-21%
OECD average	0.20		

Sources: * - IEA (2005); ** Fankhauser and Tepic (2005)
Notes: ** affordability is measured as the share (%) of household income required to pay utility bills (electricity, heat and water); services are considered affordable if their cost is below 10% of income for electricity and 10% to 15% for heating, the total cost of all utilities being under 20%; the data are predicted for 10% of the poorest population.

Energy - environment - security interactions

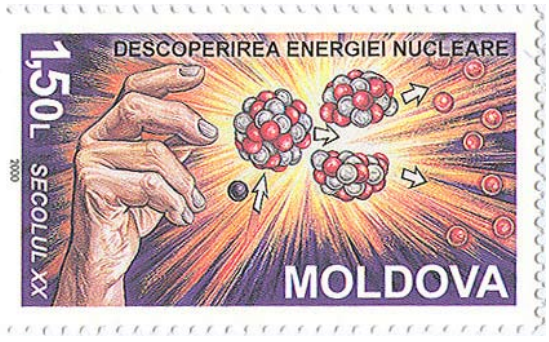


UNEP/GRID-Arendal, May 2007.

tive waste disposal (Rosenkrantz 2006). In addition it may aggravate social and political tensions, already reflected in the hostile response by Ukrainian NGOs, opposed to plans to expand the nuclear power base[23]. On the other hand Ukraine and Belarus are determined to increase energy efficiency and implement cleaner energy technologies.

The need to increase energy independence has focused fresh attention on the coal sector which currently provides up to a half of all energy, and fuels up to a quarter of electricity production in Ukraine. Belarus also has substantial deposits of brown coal. The importance of coal to the region could potentially increase, but would require major capital investment. Much as nuclear power it could result in significant environmental risks though new technologies may ensure cleaner (albeit more expensive) coal-based energy generation. Other domestic energy supply options, such as hydropower or using wood and other bio-fuels are associated with environmental, social and security impacts too (e.g. the impact of newly-built hydropower facilities on downstream areas).

Whatever the strategic choices, restructuring of the energy sector in Eastern Europe will continue, and will have a major impact on the economy and social stability as well as the state of the environment. As long as the key lessons of Chernobyl remain on the agenda, these impacts need to be fully understood and integrated into policy-making.



Environmental challenges facing the region

The Chernobyl disaster is the foremost, though by no means the only, example of the region's major environmental problems, largely associated with past disregard for the environment and the rapid industrialisation and modernisation of the USSR. Much of this legacy did not receive sufficient attention during the difficult transition years, when declining living standards, and political and economic instability took precedence over environmental issues. The transition and recent economic recovery created new environmental challenges, many of which interact with security issues at the local, regional and national level.
Major environmental problems inherited from the Soviet era are often located in and around large industrial centres. This is a result of intensive industrialisation in compact areas, inefficient use of energy and natural resources, and disregard for local environmental concerns. Air and water pollution, accompanied by degradation of the landscape and ecosystems, is acute industrial zones in Ukraine and Belarus. The wetland areas of Polesie in southern Belarus are another type of territory under stress, intensive drainage and deforestation carried out to recover land for farming having damaged ecosystems and ultimately caused a drop in agricultural productivity. Serious environmental degradation also threatens the ecosystems of the Carpathian mountains and the Azov and Black seas.

Environmental degradation often goes hand-in-hand with the declining health of local people. This overlaps with more recent economic and social problems which have often hit hardest the very same heavily industrialised areas that have the most serious environmental problems. In turn social and economic difficulties shift attention and resources away from the environment, further aggravating the situation and creating a vicious circle that poses an additional threat to social stability.

It is interesting to note that in the USSR environmentally-degraded areas often adjoined large, relatively untouched ecosystems with rich biodiversity. The Soviet command economy's ability to

restrict economic development to designated areas resulted in a specific patchwork of environmental degradation. The remaining wilderness areas have significant potential for nature conservation and tourism.

While some forms of environmental damage were reduced during the transition, others became much worse. The positive effects of transition included improved resource efficiency resulting in more realistic pricing of natural resources, new foreign and domestic investment in cleaner technologies, and a cutback in subsidies for heavy (particularly military) industry. On the down side, deregulation associated with market liberalisation resulted in laxer environmental controls. The economic and political difficulties distracted the attention of the public and policy-makers from environmental issues. The increasing focus of business on profit-making encouraged more intensive exploitation of natural resources. Environmental degradation around large industrial facilities was often made worse by chronic underinvestment in their maintenance. In addition, trade liberalisation in some cases resulted in shifts towards more pollution and resource-intensive industries (Cherp et al. 2003). The all-pervading commercial propaganda that accompanied the rise of market economies strengthened consumerist behaviour among those fortunate enough to be able to consume.

Strong, dynamically adaptive environmental protection agencies are needed to tackle this legacy and meet new challenges. Substantial progress in this field has been achieved in all three countries, particularly in view of the fact that at independence even the ministries in charge of environmental protection were barely functional. In addition to progress at home, the three countries have played a remarkable part in international agreements (see table) and European processes, such as Environment for Europe, with Kyiv hosting the fifth Ministerial meeting in 2003. Progress in drafting modern environmental legislation has been boosted by the countries' commitment (particularly for Ukraine and Moldova) to bring environmental norms in line with EU directives.

At the same time, environmental bodies in the region are still generally weak compared to their Western and Central European counterparts (reflected, in particular, in the relatively low Environmental Sustainability Index scores of all three countries cited in the Internal security section). Institutional development is particularly hampered by the insufficient priority given to the environment by the political agenda and mass media. Global environmental issues such as climate change, biodiversity conservation and unsustainable consumption attract little public attention. At the same time environmental problems causing direct health, social or economic impacts (contamination by hazardous substances, safety of water or land degradation) continue to generate significant public interest.

While a detailed picture of the environment in the three countries may be found in the specialist literature, including regular publications by national environmental authorities[24], this report focuses on specific environment-security interactions (see map). For the region as a whole these may be summarised under the three themes identified in the first chapter:

Security implications of environmental problems. Environmental problems often compound external security tensions and worsen internal security challenges in Eastern Europe. Of particular concern are environmental hazards concentrated along national borders (including the borders with the EU, Russia and borders between the three countries). Environmental hazards and

Participation of Eastern European and neighbouring countries in multilateral environmental agreements

Country / Convention / protocol*	BY	MD	UA	LT	LV	PL	SL	HU	RO	RU
UNECE conventions										
Long-range transboundary air pollution (CLRTAP)	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**
Persistent organic pollutants		R	S		R	S	A	R	R	
Heavy metals		R	S	R	R	S	A	R	R	
Environmental impact assessment in a transboundary context (Espoo)	**A**	**R**	**R**	**a**	**a**	**R**	**R**	**R**	**R**	
Strategic environmental assessment (SEA)**		S	S	S	S	S	S	S	S	
Transboundary effects of industrial accidents (TEIA)	R	R		R	R	**R**	**R**	**R**	**R**	**R**
Access to information, public participation and justice (Aarhus)	**AA**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	
Pollutant release and transfer registers (PRTR)**		S	S	S	S	S		S	R	
Protection and use of transboundary waters (Helsinki)	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**
Water and health**		R	R	R	R	S	R	R	R	R
Civil liability		S	S	S	S	S		R	S	
Other international conventions										
Transboundary movements and disposal of hazardous waste (Basel)	**A**	**a**	**A**	**a**	**a**	**R**	**d**	**AA**	**a**	**R**
Protection of biological diversity (BD)	**R**	**R**	**R**	**R**	**R**	**R**	**AA**	**R**	**R**	**R**
Persistent organic pollutants (Stockholm)	**A**	**R**	**S**	**S**	**R**	**S**	**R**	**S**	**R**	**S**
Wetlands of International Importance (Ramsar)	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**

Source: conventions' home pages.
Notes: * the names of conventions (bold) and protocols (plain) are given in a simplified form; ** - not yet in force; Signature (S), Accession (a), Acceptance (A), Approval (AA), Ratification (R), Succession (d).

Environment and security priority areas in Eastern Europe

Map by UNEP/GRID-Arendal, May 2007.

- Areas under environmental stress [1]
- Areas contaminated by the Chernobyl explosion [2]
- Strongly polluted coastal areas
- Important nature: near-border protected areas and transboundary regions of high ecological importance [3]
- Nuclear power plants (operating / closed)
- Past / current (frozen) conflicts

Land and territorial disputes

- Inter-state disputes in the process of international or bilateral resolution
- Inter-ethnic disputes

- Environment and security priority areas

Notes: 1 - Medium to high stress according to national indices of environmental conditions. 2 - Caesium-137 activity above 555 kBq/m^2.
3 - Shown only outside of areas under medium to strong environmental stress.

Sources: Belarus State University. *Atlas of Belarus Geography.* Minsk 2005; State Committee for Land Resources, Geodesy and Cartography. *National Atlas of Belarus.* Minsk 2002; Botnaru V. and O. Kazantseva. *Republic of Moldova. Atlas.* Chisinau 2005; State Committee for Natural Resources. *Integrated Atlas of Ukraine.* Kyiv 2005. Baloga V.I. (ed.) *20 Years after Chornobyl Catastrophe. National Report of Ukraine.* Kyiv 2006; Shevchuk V.E. and V.L. Gurashevsky (eds.) *20 Years after the Chernobyl Catastrophe. National Report*. Minsk 2006; Ministry of Environment Protection of Ukraine. On-line environmental maps (www.menr.gov.ua); ENVSEC consultations 2006-7.

issues of access to natural resources, involving several countries (joint management of transboundary basins of all major rivers of the region, seas and border areas) or caused by a lack of resources in an individual country (e.g., land in Crimea) also deserve serious attention.

Improving security through environmental cooperation. The openness and dynamism of the three countries' environmental institutions provides for far-reaching environmental cooperation in Eastern Europe. Such cooperation – between the states themselves, at home and with their eastern and western neighbours – can alleviate tension and bolster the region as a bridge between the EU and Russia. Cooperation on environmentally sustainable development in environment and security priority areas can alleviate internal security challenges too. Given the current political and public priorities it is often advisable to focus such cooperation on environmental issues directly related to health, economic and social well-being.

Environmental implications of security measures. Changing the pattern of military presence (for example, closing or restructuring foreign or domestic military bases) has major environmental implications, particularly associated with the clean-up of abandoned military sites. Improving border security can contribute to nature conservation and environmental cooperation, or hinder both. Similarly, most effective solutions to energy security problems have significant environmental dimensions.

In specific national and local contexts these generic patterns unfold into series of unique relationships, discussed and illustrated in the three sections of the next chapter with respect to each country.

National perspectives on environment and security

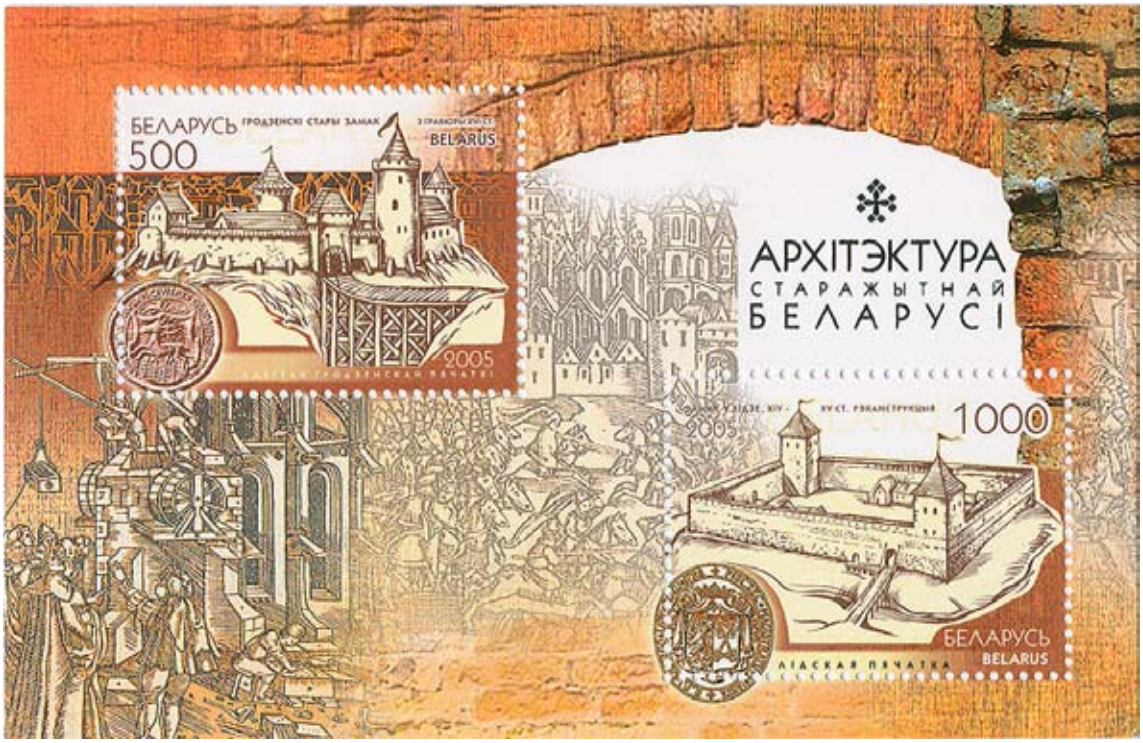
Belarus

Belarus surprises many as a unique European country. Its political and economic system deliberately retains some notable features of the Soviet model and is often subject to outside criticism. Nevertheless it prides itself on stable economic growth, high human development indicators, and social stability. In contrast to other post-Soviet countries (except Russia), it has a positive migration saldo and has not relied on Western or international financial aid. Due to its relative social homogeneity, Belarus also does not face significant risk of internal conflicts based on ethnic, religious or language grounds. The existing tensions between the authorities and the opposition, although widely reported in the West, do not seriously threaten political stability. At the same time, the economic and social stability has relied, to a large degree, on favourable prices and terms for Russian energy imports. Finding domestic energy sources is consequently a top national priority. Other security priorities include maintaining good contacts with all neighbouring countries and improving relations with the European Union institutions and members, and other Western states.

Background

Belarus is a country of 10 million people situated near the geographical centre of Europe on the watershed between the Baltic and the Black Sea. It has a 1000-km long border with EU member states (Poland, Lithuania and Latvia) in the north and the west, borders Russia to the east and Ukraine to the south.

Ethnic Belarusians make up the majority of the country's population (about 80%). Minorities include Russians (13%), Poles (4%), Ukrainians (3%) and several other groups. There are virtually no ter-



ritories of compact settlement of minorities though Poles tend to concentrate in the northwest, Russians in the northeast and Ukrainians in the south. In recent years there has been substantial immigration from Central Asia, Caucasus and parts of the former USSR.

Belarus is an important crossroad of east-west and north-south transport, communication and energy routes in Europe. For example, it is crossed by the Paris - Brussels - Warsaw - Minsk - Moscow trans-European corridor, which includes railway lines and roads, communication lines and facilities as well as oil and gas pipelines (in particular, Belarus transports about 20% of the Russian natural gas exports to Central and Western Europe). Other key communication corridors crossing Belarus include the Saint-Petersburg - Vitebsk - Gomel - Kyiv - Odesa and Helsinki - Tallinn - Riga - Vilnius - Minsk - Kyiv routes.

Apart from deposits of potassium salt, common salt, peat and some brown coal, Belarus' own mineral and energy resources are rather limited. About half of Belarus is covered by forest and wetland. Most of the rest is used for farming, which accounts for about one-fifth of economic output. Fertiliser manufacture (including production based on domestic potassium salts) is one of the key industrial branches alongside refining of oil products (imported from Russia). Other important industrial sectors include mechanical and chemical manufacturing. Belarus is a leading producer of tractors, heavy trucks, artificial fibres, plastics and mineral fertilisers among former Soviet republics. The timber industry has also been expanding in recent years.

Belarus' economy has made a vigorous recovery from the decline of the early 1990s. According to the national Ministry for Statistics and Information, in 2005 the GDP exceeded the 1990 figure by almost 27% and the 1995 figure by 94% whereas the annual growth rate was roughly 8%. This recovery was primarily based on industrial growth (increase by 226% between 1995 and 2005). GDP per capita in 2006 was $7,716 – the fifth largest in the CIS, but only 50-70% of that in the neighbouring EU countries[25]. In 2005 Russia accounted for 61% of Belarus imports and 36% of exports. Other important trade partners are EU countries and Ukraine (3% of imports in 2004: **Минстат РБ 2006)**. The current account deficit of Belarus was estimated at more than $1 billion in 2004, 2005 and 2006 which was respectively -4.6%, -3.7% and -3.4% of GDP (IMF 2007).

Security issues and priorities

Belarus believes its external security is based on good relations with all neighbouring countries (the so-called "good neighbourhood belt": **МИД РБ 2006)**. At the same time it considers Russia as its main strategic partner and guarantor of military security. Russia and Belarus are linked by a number of political (the "Union State"), economic (the common customs zone), and defence agreements. An important factor in security of Belarus is its membership of the Russian-led Collective Security Treaty. Belarus is a leading participant in the Eurasian Economic Community (EurAsEC) of six former Soviet countries which it chaired in 2006 **(БелТА 2006**). Under these treaties and several bilateral agreements, Belarus has developed strong military cooperation with Russia, including joint military exercises and air defence systems.

At the official level, Belarus' relationships with the European Union including its closest neighbours Latvia, Lithuania and Poland have been quite frosty in the last decade. Tension has centred on criticism by the EU and its member states of democratic institutions in Belarus. As a result the ratification process of the Belarus-EU Partnership and Cooperation Agreement has been frozen by the EU since 1997. For its part Belarus repeatedly accuses the EU and some of its members of interfering in its internal affairs. However some European Neighbourhood Policy programmes are open for participation by Belarus[26]. Moreover the EU is a major trade partner of Belarus. Economic cooperation between Belarus, Latvia and Lithuania is especially important as these countries provide sea ports for the export of mineral fertilisers and other Belarusian products **(МИД РБ 2006)**.

Washington is also critical of the Belarusian authorities, a position exemplified by the Belarus

Democracy Act of 2004, which was extended at the end of 2006 (US Congress 2004). In the face of such tense relations with the EU and the US, Minsk has sought other economic and political partners in various other regions of the world[27].
Finally Belarusian-Ukrainian relations are rooted in common cultures and economic interests, although the Orange Revolution and the rapprochement between Ukraine and the EU have resulted in divergences in the positions of the two countries in relation to a number of issues.

At the time of its independence Belarus possessed one of the largest stocks of conventional armaments in Europe and was the world's sixth nuclear power. It had about 200 military bases, by some estimates occupying about 10% of its land **(Пимошенко 2001, 2002; ПРООН 1995)**. Reforms over the 15 years have substantially reduced the size of its forces, with strategic nuclear weapons being withdrawn from Belarus territory by 1996. Russia still has military bases in Belarus.

As already mentioned, energy is a major security issue for Belarus. Internal resources only cover 15% to 18% of national needs. Renewable energy (hydraulic and wind power) currently account for about 1% of total electricity production. The mainstay of the existing energy system is oil and natural gas imported from Russia, and, to a lesser extent, electricity purchased from Lithuania and Russia. Several factors, including the likelihood of Russia joining the World Trade Organization, its growing demand for energy, and the commercial interests of its main producer, Gazprom, have already led to increases and may push the price of Belarus energy imports further up in the near future[28]. It is consequently a top national priority to find new sources of energy at home.

The government's Energy Programme **(Беларусь 2005)** aims to increase energy production from domestic sources and decrease the energy intensity of the economy. The current goal is to replace up to 25% of imported energy sources with domestic ones (peat, brown coal, small hydraulic power units, etc), including up to 10% from bio-fuels (primarily wood), and reduce the energy intensity of GDP by 25% in 2005-10. Belarus' location on a watershed, with flat country on either side, limits the potential of hydraulic power. Nevertheless several hydro-power stations are currently planned, including on two rivers that cross national borders: the Neman river flowing into Lithuania, and the Z. Dvina / Daugava river flowing to Latvia **(Беларусь 2005)**. The government is also considering plans to build a domestic nuclear power plant by 2015, considering in particular potential sites in Mogilev oblast (a similar project was already under way in the 1980s and 1990s, but was shelved following the Chernobyl accident, with a ten-year moratorium recommended by a government commission in 1999: UNECE 2005a). These plans will need to take into account concern, at home and abroad, regarding economic and technical feasibility, and the safety of new nuclear power facilities[29].

Environment and security challenges

The Concept of National Security of Belarus[30] focuses on both external and internal security issues. It directly refers to environmental problems such as global climate change, transboundary transport of pollution and the risk of serious accidents at industrial facilities located in Belarus and other countries close to Belarus borders, land degradation and radioactive contamination resulting from the Chernobyl fallout (discussed in the previous chapter).

Having a number of **major river basins shared** with neighbouring countries, Belarus pays special attention to transboundary cooperation in the field of management and protection of water resources, including surface waters (in the Z. Dvina, Neman, Pripyat - Dnieper, and Z. Bug river basins) and groundwater (e.g. an extensive Mesozoic aquifer system shared with Poland and Ukraine) resources. Of special importance is joint management of the Z. Dvina and Dnieper water resources due to the economic significance of these rivers.

All major rivers of Belarus receive wastewater from industries and municipal sewage systems, with the biggest impact downstream from Minsk on the Svisloch river, a tributary of Berezina and ultimately the Dnieper. The Dnieper itself receives wastewater downstream from Mogilev. But there are significant threats to the water quality of other rivers too. For example the Z. Dvina / Daugava supplies most of the drinking water for Riga, the capital of Latvia, yet at the same time it is saddled with some of the most dangerous facilities in Belarus industry: Novopolotsk refineries and chemical plants.

Environment and security issues in Belarus

Water-related issues

- Important discharges of wastewater in transboundary water basins
- Poor to bad water quality [1]
- Lack of coordination and infrastructure for transborder flow control
- Dams (existing / projected)

Energy and radiation issues

Areas exposed to high radioactive contamination due to the Chernobyl explosion:

- Caesium-137 activity above 555 kBq/m²
- Plutonium isotopes activity above 4 kBq/m²
- Nuclear power plants (operating / projected / closed [2])
- Radioactive waste storage sites (in use / considered)
- Oil refineries
- Oil fields
- Gas processing plants
- Brown coal deposits
- Major peat deposits

Other pollution issues

- Main industrial centres
- Storages of obsolete pesticides
- Potassium mining (waste and water pollution)
- Forest fires in Chernobyl-contaminated areas
- Environmental concerns related to military areas (in use / closed)

Important nature [3]

- Major protected areas / transboundary regions of high ecological importance

Notes: 1 - National water quality index below two. 2 - The last Chernobyl reactor was stopped in 2000. 3 - Only near-border nature areas are shown.

Sources: Belarus State University. *Atlas of Belarus Geography*. Minsk 2005; State Committee for Land Resources, Geodesy and Cartography. *National Atlas of Belarus*. Minsk 2002; Shevchuk V.E. and V.L. Gurashevsky (eds.) *20 Years after the Chernobyl Catastrophe. National Report*. Minsk 2006. Baloga V.I. (ed.) *20 Years after Chornobyl Catastrophe. National report of Ukraine*. Kyiv 2006; ENVSEC consultations 2006-7.

Belarus is party to international and bilateral agreements on transboundary water protection and cooperates on specific monitoring and water management projects on the Dnieper (with Russia and Ukraine), Z. Dvina / Daugava (with Russia and Latvia), Neman (with Russia and Lithuania) and Z. Bug (with Poland). Cooperation under the agreements is supported through international assistance[31]. Belarus, Russia and Ukraine cooperate on the management of water resources in the Dnieper river basin, where GEF supported the Environmental Health in the Dnieper River Basin programme focusing on a number of activities, from cleaner production and prevention of industrial accidents in Belarus to pollution monitoring in Ukraine and biodiversity conservation in Russia (UNDP and GEF 2006).

Cooperation with Ukraine on the management of the Pripyat river's water resources is just starting to take shape. Some Pripyat-related issues are dealt with as a part of Dnieper cooperation, and since 1999 the EU TACIS programme supported a project to identify issues and plan transboundary cooperation between Belarus and Ukraine notably in the Pripyat basin (JRMP 2004a, b). One of the challenges remains a coordinated control and monitoring of river flow. Spring floods on the Pripyat are a major concern for Belarus[32], but can only be properly regulated, or at least anticipated, in collaboration with Ukraine where most of the river's southern tributaries originate. In addition to reducing damage from floods, Belarus would like to improve management of the Dnieper-Bug canal, linking rivers flowing towards the Baltic and the Black Seas, by regulating the flow of these tributaries and the water level in the transboundary Beloye / Bile (white) lake sysem. Ukraine's interest is linked to ensuring a minimal water flow in its part of the upper Pripyat. The country is also keen to maintain ecosystems of the Shatsk Lakes including Svitiaz, the "Ukrainian Baikal", the deepest and one of the largest lakes of Ukraine.

The Pripyat watershed encompasses most of **Polesie**, a unique geographic region and an ecosystem of European importance straddling the border between Ukraine and Belarus, reaching as far as eastern Poland and the west of the Bryansk region of Russia. Polesie (*forest land*), which covers approximately 30% of Belarus, is the largest expanse of marshland in Europe, a habitat for many endangered bird species, and the site of several inter-

nationally important wetlands protected under the Ramsar convention. In Belarus, large parts of Polesie – and other wetlands – were "meliorated" especially in the 1960s-1980s to enable farming. This process included draining marshlands, "straightening" rivers, building embankments to halt flooding and other similar measures. The area of meliorated land covered 16% of the whole country, and up to 20% or 30% of some river basins. The melioration often disregarded environmental factors, impacting negatively on ecosystems and natural resources. In particular it affected the local climate leading to higher frequency of drought and frost and eroded light and peat soils, ultimately leading to desertification. These effects were not only ecologically destructive, but also reversed initial gains in agricultural productivity. Some of these problems were aggravated by the effects of the economic decline of the early 1990s and low investment in maintenance of existing drainage systems. The current land use policy in Polesie does not aim to extend "meliorated" areas but to improve the management of existing systems. This may help to slow down land degradation. A GEF project is testing various techniques for restoring drained wetlands and ecosystems, while conserving biodiversity (UNDP 2006a). The fallout from the Chernobyl accident contaminated large territories of Polesie, making the use and management of land there even more problematic. Parts of Belarusian Polesie in the immediate vicinity of Chernobyl are closed for human settlement and economic activities and are administered by the Polesskiy Radiation-Ecological Reserve (see Chernobyl box in the previous chapter).

At present international cooperation for protecting the key **ecosystems** of Polesie is only just beginning. For example, discussions with Ukraine about cooperation on the Prostyr / Pripyat-Stokhod transboundary protected territory are now underway (supported by UNDP). A three-party nature reserve Pribuzhskoye Polesie in the Shatsk area is being established with support from UNESCO's Man and Biosphere programme and participation by Belarus, Ukraine and Poland (the project is linked to the concept of creating a regional ecological network in Polesie)[33]. Polesie is just one of the territories where international cooperation in biodiversity and ecosystems protection can be effective. In general, Belarus wishes to further develop its system of protected territories[34] as a bridge between European (Natura 2000) and Russian environmental networks. This would require cooperation at the national level and possibly on individual transboundary protected territories, such as Belovezhskaya Pushcha on the border with Poland.

Another category of environmental problems with security implications relates to **hazardous industrial sites** and polluting facilities. As elsewhere, these tend to be concentrated in industrial centres. In recent decades industrial facilities have suffered from chronic underinvestment, particularly for maintaining pollution control equipment. Mining and processing of potassium salt ore in the vicinity of **Soligorsk,** close to Polesie's northern border, cause major environmental impacts. Mining activities have caused major changes in the landscape, land subsistence[35] and swamping. Accumulated mine tailings exceeded 778 million tonnes in 2004. These waste deposits are exposed to wind and water erosion. There is a steadily growing area of salinized surface and ground water currently encompassing more than 15 square kilometres, reaching of up to 100 metres underground. It has not yet been established whether there is a risk of contamination spreading to aquifers connected to the Pripyat river. There are also signs of deteriorating health among the local population, aggravating an already complex demographic and social situation in mining towns with relatively high levels of HIV / AIDS infection and drug addiction[36]. The issues most apparent in Soligorsk are characteristic of other **industrial centres** of Belarus, such as Novopolotsk and Mozyr. These centres are not only sources of significant pollution, but also represent risks of industrial accidents potentially associated with transboundary contamination, such as oil leak in March 2007[37]. Belarus, as a party to the Convention on the Transboundary Effects of Industrial Accidents, registers such hazardous facilities and commits itself to develop appropriate early warning systems.

Hazardous facilities located close to Belarus borders **in other countries** rank as an important environmental and security issue. Most border areas in Belarus are rural and less developed than central areas. The presence of hazardous facilities across the border fuels a sense of danger among the local population, driving outward migration and further depressing economic activities. The nuclear power plant at **Ignalina** is the closest to the Belarus border and uses a transboundary body of water (lake Drysviaty, Druksiai in Lithuania) for cooling. Areas adjacent to Belarus, such as the Braslav Lakes national park, have significant recreational value and

are protected. However their leisure potential is jeopardised by the proximity of the nuclear power plant. The Ignalina nuclear reactor is scheduled for decommissioning with support from the European Commission. However there are also plans to build a low and intermediate level short-lived radioactive waste storage facility in the area. There are also reports of plans to build a new reactor at the same site to supply power to the three Baltic countries. Concerns over decommissioning of the Ignalina power plant, prospects of storing spent fuel, development of a brown (industrial) site and even construction of a new nuclear reactor there are closely connected to the idea of creating a Euro-region in Visaginas, home to the Ignalina power plant[38]. The environmental authorities in Latvia are concerned about potential impacts of the storage of spent fuel on the quality of Daugava water[39]. Belarus is also concerned about Russian and Ukrainian nuclear power plants operating near its borders, and by the possibility that Ukraine may locate a depot for spent fuel from its nuclear industry in the **Chernobyl**area**(Цаплиенко2006;Хармс2006;Vasylevska 2006).**

Stockpiles and disposal sites of toxic waste, including obsolete pesticides, are another key issue. It is estimated that the amount of banned and outdated hazardous pesticides in Belarus exceeds 6,000 tonnes including 718 tonnes of DDT. There are also more than 2,700 tonnes of unidentified (potentially hazardous) pesticides. About two-thirds of all pesticides are buried at various disposal sites – the rest are stored at farms and industrial facilities, often under unsuitable conditions. Of the seven pesticide disposal sites, five are close to state borders. The GEF and the Danish government backed an inventory of dangerous pesticides and the start of protective measures. Of the four sites inspected in 2002-4 significant risks were identified on at least two facilities. Some measurements show contamination of water and foodstuffs by persistent organic pollutants, though in general information on this issue remains incomplete. More work is needed to characterise these risks and design adequate protection measures (MNREP 2006, **БелНИЦ «Экология**» 2006).

Defence facilities and activities in Belarus are of high significance for the environment. The armed forces use more than 300,000 hectares of land including over 200,000 hectares of forests, consume over 5 million cubic metres of water and produce about 8% of national emissions of air pollutants. Of particular significance may be discharges of insufficiently treated wastewater and contamination of the environment by oil products accumulated in soil and due to aging storage infrastructure, especially at military airports and air bases such as the former strategic airbase at Bykhov in the Mogilev oblast. Several of these areas have been withdrawn from military use, leaving local authorities with the unexpected challenge of having to clean them up and reclaim the land. Another concern is the high level of electromagnetic radiation in and around some military facilities. However the most important environmental issues concern planned disposal of armaments and ammunition (including toxic and radioactive materials). The armed forces of Belarus have established environmental management systems to address existing and potential concerns **(Азема 2005, Кондратенко 2006).**

Key environment and security issues and interactions in Belarus

<table>
<tr><th>Security
Environment</th><th>Promoting energy security</th><th>External relations</th><th>Social and political stability</th><th>Military activities and restructuring</th></tr>
<tr><td rowspan="2">Hazardous sites and facilities</td><td rowspan="2">Risks associated with development of nuclear power

Impact of energy pipelines</td><td>Stockpiles of hazardous substances located near borders</td><td></td><td rowspan="6">Pollution at defence sites and facilities. Disposal of obsolete armaments.</td></tr>
<tr><td colspan="2">Impacts of radioactive waste depots upon border areas

Local and transboundary impacts of Soligorsk, Novopolotsk and other industrial centres</td></tr>
<tr><td rowspan="2">Water management</td><td rowspan="2">Environmental impacts of planned hydropower development</td><td colspan="2">Protection and management of the Drysviaty and Braslav lakes</td></tr>
<tr><td>Protection and management of Z. Dvina, Dnieper, Neman, Z. Bug</td><td></td></tr>
<tr><td rowspan="2">Ecosystems management and biodiversity protection</td><td rowspan="2">Environmental impacts of increased production of bio-fuels, peat and brown coal</td><td colspan="2">Management of Polesie marshlands including the Pripyat basin (flow control), Dnieper-Bug canal and Chernobyl-contaminated areas</td></tr>
<tr><td>Regionally coordinated network of protected areas</td><td></td></tr>
</table>

Finally Belarus **policies on energy security** have many potential impacts on the country's environment. The projected widespread use of wood biomass as fuel will improve the carbon efficiency of the national energy balance, but the use of peat, brown coal, and other fossil fuels may be less climate-friendly. There are also significant environmental concerns associated with the rapid increase in logging, coal mining and peat extraction with respect to regional (sulphur and nitrogen oxide emissions) and local impacts (disruption of ecosystems, local air pollution). International attention has also been drawn to the impact of bio-fuel development on global food security (Brown 2006), and similar concerns may prove to be significant in Belarus. The projected development of hydro-energy on small rivers crossing the Belarus plain also has environmental and transboundary aspects. At least one of the planned hydropower plants on the Neman river close to the Lithuanian border, may cause transboundary environmental effects. Obviously, building a nuclear power plant may also lead to a number of environmental impacts, as discussed above in relation to the Chernobyl disaster and the Ignalina power plant. Traditional energy facilities, such as gas and oil pipelines and refineries, are also associated with environmental risks. On the other hand, planned efforts in the area of energy conservation may bring improvements to the environment, the economy and overall security.

Apart from the Ministry of the Environment and Natural Resources, the Ministry of Emergencies, the Ministry of Forestry, the State Committee for Property (formerly Land Resources, Geodesy and Cartography), and the Administration of the President also address certain environmental issues. Belarus has a relatively advanced environmental legislation and is implementing several strategic initiatives, such as the National Programme of Sustainable Development adopted in 2005 and covering the period until 2020. Belarus is party to some twenty international environmental conventions and protocols, and is also involved in a number of bilateral agreements on environmental issues. At the moment some environmental issues are incorporated into the National Security Strategy (see the beginning of the section) which should be followed by all **governmental authorities** in order to integrate security priorities into sectoral policies.

Ukraine

In many respects, including economic potential and population, Ukraine is the second largest post-Soviet country. It plays a key role in the post-Soviet space, for example within such international organisations as the Organization for Democracy and Economic Development – GUAM. Ukraine has firmly declared its commitment to European integration, whereas it also considers Russia its central strategic partner, especially with regard to energy issues. Balancing these orientations is a crucial national security issue, and the precise form of such a balance is subject to lively debate in Ukraine, which is also shaped by the country's geographic, economic and cultural diversity.

Ukraine's environment still suffers from the legacy of the past – overshadowed by the 1986 Chernobyl disaster as well as stockpiles of Soviet-era industrial and military waste (exemplified by more than 16,000 tonnes of leftover toxic component of Soviet rocket fuel) – and is under increasing pressures

from present economic activities. Yet rich natural resources and biodiversity offer a high potential for further development of Ukraine as well as for greater cooperation with neighbouring states on common environmental goals.

Background

Ukraine has been a centre of East-Slavic culture since the establishment of the medieval state Kyiv Rus, in the late ninth century, though its sovereignty has been frequently contested throughout its history. Today the country has a population of over 47 million people and territory of 603,700 square kilometres. According to the 2001 census, 78% of the population are Ukrainians and 17% are Russians, with the remaining 5% belonging to various national minorities.

Ukraine's position between East and West and its warm water ports on the Black Sea have made it an increasingly important trade link between the former Soviet republics, and Europe, the Middle East and the Mediterranean basin. Ukraine is crossed by oil and gas pipelines that originate in Russia and the Caspian Sea region, and terminate in Western and Central Europe. The recently opened Odesa-Brody oil terminal can receive Bulgarian, Romanian, Turkish, Middle Eastern and now also Caspian oil transported through the Black Sea. There is a minor network of pipelines for other products, including the Tolyatti (Russia) - Horlivka - Odesa ammonia pipeline and the Kalush - Tiszaujvaros (Hungary) ethylene pipeline.

Ukraine is abundant in natural resources. Large deposits of iron ore (27 billion tonnes) near Kryvyi Rih, Kremenchuk and Zaporizhzhia provided a foundation for the domestic steel industry. In addition to globally significant deposits of manganese (more than 40% of known global deposits), Ukraine has important reserves of potassium, magnesium and common salts, and lesser deposits of nickel ores, graphite, titanium, and other minerals. Relatively small reserves of oil and gas are offset by large coal and brown coal reserves concentrated in the Donbas region in the East of the country, placing Ukraine among the world's top 10 coal producers. Ukraine has its own uranium ore deposits, and

Environmental and security implications of withdrawal and restructuring of the Black Sea fleet

The Soviet Black Fleet had been a strategically and historically vital asset with the main force based at Sevastopol, Crimea. The disagreements of the early 1990s concerning the ownership of the fleet and Sevastopol naval base were settled by a 1997 treaty which divided the Black Sea fleet equally between Russia and Ukraine, though Russia bought back many of the most modern ships, ultimately leaving it with about 80% of the fleet. Russia agreed to withdraw its fleet from Crimea starting in 2017 if the agreement on the use of naval bases is not prolonged. Russia also agreed to lease the ports in and around Sevastopol for 20 years.

Co-existence of Russian and Ukrainian naval and armed forces in Crimea and longer-term restructuring, withdrawal and partial decommissioning of the Black Sea fleet make management of the related environmental issues and liabilities particularly challenging. Many of these issues mesh with the acute environmental problems affecting the Black Sea and Crimean peninsula described later in this report. These are an example of interaction between security measures and environmental quality.

Sources: **Felgenhauer (1999); Plokhy (2000).**

one of the largest uranium mining industries in the former Soviet Union is located in the Dnipropetrovsk region. Four nuclear power stations – Zaporizka, Pivdennoukrainska, Rivnenska and Khmelnitska, operating 15 reactors in all – produce almost half of Ukraine's electricity. By 2030 Ukraine plans to deploy additional nuclear generation capacities, more than doubling the total energy output of its nuclear power plants (CMU 2006). Alongside fuel and energy production and ferrous metallurgy, Ukraine's main industries include manufacturing of heavy machinery, chemicals, construction materials, and timber. Once the "bread basket of the Soviet Union" Ukraine also has rich soils and an agricultural sector that employs almost a quarter of the workforce. Ukraine is a major exporter of ferrous and non-ferrous metals, chemicals, machinery and equipment, and food. Ukraine imports mainly fossil fuels and their derivatives, equipment and spare parts, chemicals, plastics and rubber.

Ukraine suffered a longer period of economic recession than most other former Soviet republics. However, since 2000 the economy has steadily recovered, with annual growth of GDP peaking at 12.1% in 2004, but falling to 5.5% in 2005 and 5.4% in 2006 (IMF 2007) with consumer prices forecast to rise by 13% a year. However per capita GDP (in purchasing power parity) has recovered from a low of $3,700 to approximately $7,800 in 2006, more than 10% above the 1991 level. At the same time, according to various estimates, 15% to 30% of the population were below the poverty line in 2003[40].

Ukraine places high hopes on entering global markets which depends upon its incumbent WTO membership. By 2007 parliament had passed all the laws necessary for joining the WTO, and Ukraine expects to become a full member by the end of the year. Currently its main export customers are Russia, Belarus, Moldova, EU member states and China. It primarily imports oil from Russia and gas from and Russia Turkmenistan, and manufactured goods from Western Europe and the US (UNECE 2004, 2005b). More than two-thirds of Ukraine's exports come from four industrially developed regions: Kyiv, Dnipropetrovsk, Zaporizhzhia oblasts and the Donbas.

Security issues and priorities

In the recent years, Ukraine made European integration a foreign policy priority – as expressed for example in the Law on National Security of 2003 proclaiming NATO and EU membership as key policy goals. This move sets the stage for a complicated long-term realignment of interests and forces in the region.

To support democratic transformation in Ukraine, the EU has made it a priority partner country within the framework of its European Neighbourhood Policy (see box in the Regional context chapter). A joint EU-Ukraine Action Plan was issued in February 2005. The EU gave Ukraine the Most Favoured Nation status in trade and declared it a "market economy" in 2005, further facilitating trade. With about 35% of Ukraine's total trade, the EU is currently the country's most important trading partner. Ukraine also cooperated with the EU and Moldova in addressing the Transnistria conflict, especially in winter-spring 2006 when, with Chisinau, it introduced a joint customs regime for Transnistrian trade (see Moldova section).

Closer political ties with the West and military reform also raise questions concerning possible NATO membership for Ukraine, another high priority, especially in the light of the relatively dim prospects for EU membership in the foreseeable future. At the same time, the recent Presidential (2004) and Parliamentary (2006) elections highlighted political divisions in Ukrainian society with respect to foreign policy orientation, especially relations with NATO.

Russia is an equally important partner of Ukraine. Trade between the two countries is substantial and cooperation is essential for both parties, primarily with respect to the supply and transit of energy. At the same time, the interests of the two largest Soviet successor states do not always coincide. In the early 1990s, the two countries had a disagreement concerning the status of the Black Sea fleet and its base at Sevastopol, Crimea. The issue was satisfactorily managed and largely resolved only in 1997 with the adoption of a bilateral agreement. Similarly an agreement on environmental security and controls at Russian Navy bases in Crimea was signed in 1998. Environmental security in the region will consequently depend to a large extent on strict implementation and enforcement of existing agreements. The presence of the fleet continues to pose a number of environmental and security issues and its decommissioning and withdrawal will require special attention (see box).

A key national and regional security issue with important environmental implications is energy. Ukraine significantly relies on Russian oil and gas exports and depends on the Russian gas transportation network to import gas from other countries, mainly Turkmenistan. On the other hand Ukraine is still the most important transit country for supplying Central and Western Europe with Russian energy resources, conveying some 85% of Russia's oil exports and 80% of its gas exports to Europe. The system for gas transit is supported by gas storage facilities with a total volume of 30 billion cubic metres in western Ukraine. The Odesa-Brody pipeline (see box) has been an attempt to develop energy transportation routes for purposes other than conveying Russian fossil fuels. The role of energy in national and regional security became especially evident during the gas crisis of winter 2005-6 when Russia's Gazprom cut off natural gas supplies to Ukraine[41]. As a result the energy supply to Central and Eastern Europe was disrupted, focusing national and international attention on energy and prompting high-level negotiations.

Odesa-Brody pipeline. Full astern!

The Odesa-Brody pipeline was planned in the early 1990s to transport Caspian oil (from Azerbaijan and Kazakhstan) to Central and Northern Europe through the largest Ukrainian sea port Odesa and a western Ukrainian town Brody. The 667 kilometre pipeline system opened in August 2001 with capacity to carry from 9 to 14 million tonnes of oil a year. At the same time Ukraine tried to negotiate with Poland a 560 kilometre extension of the system to the Polish city of Plotsk, enabling Caspian oil to be conveyed to the Baltic port of Gdansk. In May 2003 agreement on the extension was finally reached, but by then Ukraine was unable to secure supplies of Caspian oil to operate the pipeline as planned.

Russian companies offered to operate the pipeline in the opposite direction to transport Russian oil through Belarus and Brody to Odesa. In 2004 a three-year agreement with Russia's TNK-BP was signed to transport 9 million tonnes of Russian oil a year to Odesa in reverse mode.

Although the $450 billion Plotsk extension of the pipeline is one of the EU's economic priorities, the project is currently still at the assessment and planning stage. It is consequently most likely that the system will be working in reverse mode until the extension is completed. Once the pipeline is extended to Plotsk it may significantly reduce Ukraine's dependency on oil transiting from Russia.

Source: **Нефть и Капитал (2005); Попов (2006).**

Ukraine has a Memorandum of Understanding with the EU on energy signed in December 2005, setting forth a strategy for integrating the Ukrainian energy system with the EU and outlining three other priority areas for cooperation: nuclear safety; energy supply and transit security; and modernisation of the coal sector (which, along with nuclear power and the search for more domestic sources of natural gas, is seen as a possible way of reducing energy dependency). In February 2006, in the course of one of his regular broadcasts to the nation, President Yushchenko announced the start of an Energy Efficiency Agency and set a target to cut gas consumption by 10% in 2006.

Ensuring energy security in Ukraine is complicated by the fact that it is one of the most energy-intensive countries in the world because of the structure and inefficiency of its industry. Its energy intensity in 2003 stood at 3.37 TOE per $1,000 (at 2000 economic conditions), about 15 times higher than the United States and almost 30 times higher than Japan. Even Ukraine's fellow transition countries have lower energy intensities: Poland 0.53, Romania 0.91 and Russia 2.01 TOE per $1,000 (at 2000 e.c.). Ukraine's industry suffers an even larger differential in terms of energy-intensity, and consumes more than 45% of total energy demand, 35% of all the natural gas and 53% of electricity. The main energy consumers are chemical and metallurgical plants in eastern Ukraine. The International Energy Agency, in its statement on 13 October 2006, called on Ukraine to increase energy efficiency[42].

Natural gas is especially important for Ukraine. In 2005 Ukraine consumed 75 to 80 billion cubic metres of gas, about 55% of which was used by industry. Substituting gas with coal, nuclear, hydro or other energy sources may decrease energy dependency but also give rise to diverse environmental challenges.

Environment and security challenges

Compared to its neighbours, Ukraine has a very low Environmental Sustainability Index (ESI) (ranking 108 out of 146 countries; Esty et al. 2005). This is primarily due to the high energy and pollution-intensity of its industry, pressure on ecosystems due to intensive agriculture, water stress on part of its territory, and insufficiently developed environmental **institutions**.

The 2003 Law on the Foundations of National Security of Ukraine (Ukraine 2003) takes a broad view of national security and refers to such environmental issues as industrial pollution and waste hazards, deteriorating water quality, unsustainable use of natural resources, the unsafe legacy of past military activities, and the environmental hazards associated with energy technologies. Among external security threats, the law cites global environmental change and imports of potentially hazardous technologies including genetically modified organisms (GMOs). It also mentions transboundary environmental issues including management of shared water basins, and pollution of the Black Sea and the Sea of Azov.

Water resource management is an important issue in Ukraine, especially in the south, including water-deficient Crimea[43]. Ukraine shares most of its major river basins with other countries, and places high priority on international cooperation; the country has concluded agreements with all of its neighbours and several other states concerning main transboundary river basins (see table).

Parties to agreements or conventions with Ukraine related to shared river basins

River basin	Parties
Dniester	Moldova
Z. Bug	Poland
Dnieper, Pripyat, Sozh	Belarus
Dnieper, Don, Desna, Siverskyi Donets	Russian Federation
Tisza, Prut, Siret (Danube basin)	Romania
Tisza	Hungary
Tisza including rivers Uzh and Latoritsya	Slovakia
Danube	Austria, Bulgaria, Croatia, Germany, Hungary, Moldova, Romania, Slovakia, European Union
Black Sea	Bulgaria, Georgia, Romania, Russia, Turkey

Although water consumption in Ukraine has fallen in recent years, the overall human impact on fresh water resources is still at the 1990 level when the Soviet economy was at its historical peak. It is estimated that about 39% of discharged water is polluted and about 25% of the polluted discharges do not undergo any prior treatment whatsoever. Much of water pollution affects neighbouring countries or the Black Sea and the Sea of Azov through transboundary watercourses.

Substantial pollution of the Lower Dniester in the Odesa oblast by organic substances and pathogenic micro-organisms is caused by Moldova where in many cities communal waste waters are disposed of without proper treatment (see Moldova section for details). Conversely, on the upper reaches of the Dniester water quality suffers from discharges in Ukraine. The transboundary issues of Dniester basin management are addressed by a number of international support programmes[44].

Transboundary chemical pollution (especially water and air) is caused by industrial facilities in the neighbouring countries. For example chemical and oil processing facilities in eastern Slovakia and Romania result in transboundary water pollution in the Zakarpatska oblast. Pollution also enters Ukraine from Belarus (through the Dnieper and Pripyat rivers, see Belarus section) and Poland.

Some water management issues have caused international disputes. For example Romania has expressed concern in a number of international forums regarding Ukraine's plans to develop the Bystre canal. There have been disagreements between Moldova and Ukraine over the construction of an oil terminal and refinery at Giurgiulesti and a railway linking Izmail and Reni, despite positive signs that such concerns may be smoothed out to facilitate tri-partite cooperation on sustainable development of the whole Danube delta (see box). Several land and water management issues are also closely linked to security aspects of social issues in Crimea (see box).

Environmental, economic and transboundary issues in the Danube delta

Romania and Ukraine share the Danube delta, in close proximity to the frontier with Moldova. The delta is highly significant economically (and politically) as a major transport hub connecting Black Sea routes and the Danube navigation corridor as well as for fishing. The Danube also carries much of the water (and pollution) flowing into the Black Sea. The delta, second largest in Europe after the Volga's, is a unique, valuable and vulnerable ecosystem of international importance, home to about 90 species of fish (including several endangered species of sturgeon), 300 bird species (including the largest pelican colony in Europe), and over 1,000 plant species. It is a UNESCO World Heritage site, with several biosphere reserves.

Environmental, economic and political problems of the delta are best illustrated by recent concerns regarding three economic projects:

- The Bystre canal between the Danube and the Black Sea;
- The Giurgiulesti oil terminal;
- The Reni-Izmail railway.

For Ukraine the main reason for building the 3.5 km **Bystre canal** through the village of Vylkove is to assist economic development of the parts of Odesa oblast close to the Danube. Currently the Ukrainian ports of Izmail, Reni and Ust-Dunaysk operate at 20% of their capacity, and the Ukrainian arms of the Danube delta are severely silted. Meanwhile Romania operates four canals and its port at Costanta is considered the Black Sea gate to the EU. Over the last 20 years Romania has invested about $3 billion in developing the transportation infrastructure of the Danube. Ukraine uses Romanian waterways, for which it pays $120 million a year. The Bystre canal would allow Ukraine to transport at least 15 million tonnes of freight a year across its own territory. However Romania would lose its monopoly over Danube-Black Sea transportation, with up to 60% of existing traffic being able to use the shorter route via Bystre[45].

Construction of the Bystre canal started in 2004 and resulted in significant environmental disagreements between Romania and Ukraine. Romania argued that the project would have a lasting negative effect on the Danube delta and would thus constitute a significant source of transboundary impacts, as covered by the Espoo Convention. In particular, it was argued that the project would cause the loss of terrestrial and aquatic habitats, further jeopardising already highly endangered migratory bird species, degrading water quality, and imposing economic losses on Romania. The project has also attracted criticism from environmental NGOs and attention from various environmental organisations including both Danube delta biosphere reserves, the International Commission for the Protection of the Danube River, and the secretariats of several international conventions. In response to a petition from Romania the secretariat of the Espoo Convention formed an official inquiry commission to study the likely effects of the canal. On 10 July 2006 the committee issued its report, finding that the project was likely to have significant transboundary effects, which in turn triggered the consultation and public participation provisions of the Convention. The Espoo Convention inquiry commission's report comes on the heels of a finding by the Aarhus Convention Compliance Committee, published on 18 February 2005, that the Ukrainian government had violated its obligations under the Aarhus Convention. In particular it had failed to involve the public in project decision-making, to provide information on the project, and to develop a framework for implementing the Aarhus Convention within the scope of the project. In response Ukraine accused Romania of exaggerating the project's environmental impact to address its own economic concerns. In 2004-6 the Ukrainian authorities carried out detailed environmental monitoring in the Danube delta which seemed to indicate that the impact of dredging and construction work on water quality and the hydrological regime had only affected a limited area. Such studies should continue to validate this conclusion in a longer-term perspective, and to also assess the impact of potential cargo traffic in the canal. Ukraine overall maintains that the environmental impacts of Bystre are not of a transboundary nature, and that any environmental assessment and

monitoring should be conducted in the context of Romanian waterways already in operation. Another Ukrainian counterargument is that the Bystre canal is simply an enlargement of the existing waterway, the Bystre river, making it suitable for navigation.

Another series of transboundary environmental disagreements in the same region involved Ukraine and Moldova, both of which encountered transportation problems created by the collapse of the Soviet Union. Moldova lost access to the Black Sea through navigable waterways because the Danube was on Ukrainian territory, its closest point, the mouth of the Prut, being several hundred metres from the Ukraine - Moldova border. Ukraine lost access by land to its town of Reni except across Moldovan territory.

In 1993 Moldova claimed a 1.5 km strip of Ukrainian land along the Danube. According to a settlement reached in 1998, Ukraine gave up a 430 metre strip of land near the village of **Giurgiulesti** and 150 hectares of land next to Besarabca railway station as well as some other property. Moldova applied for an EBRD credit to build a terminal to receive oil transported through the Black Sea and up the Danube, and subsequently an oil refinery next to Giurgiulesti. Construction work started in 1997, after the funds were allocated, and was due to be finished by 1999. However when it became clear that it would not be possible to operate the terminal at full capacity (1 million tonnes a year, gradually increasing to 2 million tonnes) construction stopped. After attracting additional private investment the project was completed in 2006. There are currently plans to upgrade the terminal with a refinery and a passenger port. Ukraine and some environmental groups pointed out the potentially negative impacts of the terminal on the Danube delta and the risk of pollution that it poses to Reni and Izmail. Of particular concern was the high risk of an accident due to the difficulty of navigation at that point of the river, and the potentially devastating consequences for the Danube delta. Terminal investors however state that the facility is to comply with both national and the EU's environmental and safety legislation, so that no elevated risk should be expected.

According to the same 1998 agreement on exchange of land, Moldova gave Ukraine control over a 7.7 km stretch of secondary road linking Izmail to Reni. After Moldova increased customs fees for transporting Ukrainian goods crossing its territory through the only railway branch connecting Reni with the rest of the country, Ukraine decided to build another **railway linking Reni to Izmail** along the Danube and only passing through its own territory. Moldova objected to this project citing possible environmental impacts. Some Ukrainian environmentalists supported the objections, emphasising the threat of a regional environmental catastrophe posed by the project. Finally, in 2006, the Ukrainian government decided that the $1.2 million project, though politically important, was economically inefficient and that it would not be implemented.

To sum up, the vulnerable ecosystem of the Danube delta is the locus of several heated disputes where genuine, justified environmental concerns overlap with agendas driven by economic and political considerations. Balancing these interests remains a difficult task for both politicians and environmentalists. At the 2006 tripartite meeting in Odesa in the presence of the ICPDR (International Commission for the Protection of the Danube River), an attempt was made to unblock the situation and switch the attention of parties from their controversies to a broader objective of sustainable development of the Danube delta, a site of significance to the whole Black Sea region. Although debates still continue, there may be prospects of solving some of the enmeshed problems on the basis of broader common interests.

Sources:
Bystre: Dutu (2005); Staras (2005); for background on the dispute see e.g. Espoo convention www.unece.org/env/eia/inquiry.htm; Aarhus convention www.unece.org/env/pp/compliance/S2004-01/DatasheetS-2004-01v.30.06.05.doc; www.unece.org/env/pp/compliance.htm; Odesa meeting under patronage of UNESCO and ICPRD 2006 - conference.blackseatrans.com/ (see Ukraine et al. 2006); European Commission on the Black Sea and Danube Delta: ec.europa.eu/environment/enlarg/danubeblacksea_en.htm; **Загородний (2006); Бурлаку (2006); Котенко (2004);** Ministry of Environment Protection of Ukraine. Giurgulesti and Izmail-Reni: **Полтораков (2006), Барсук (2006), Подробности (2006b)**, EBRD.

The economically important and ecologically unique Black Sea and the Sea of Azov are vital areas of regional cooperation for Ukraine. Ukraine's Black Sea coast is 1,802 km long and its Sea of Azov coast extends for 825 km. Ukraine's territorial waters cover 57% of the Black Sea shelf[46]. The Ukrainian part of the Azov and Black Sea shelves contains 18% of the country's oil and gas reserves (UNECE 2005b). Some of these reserves are located around the island of Zmiinyi in waters claimed by both Ukraine and Romania. The Black Sea and Sea of Azov are subject to intense pressure from heavy industry, intensive farming, large population centres, and many military installations in their coastal areas.

Both seas face a wide range of ecological problems: microbiological, organic and other pollution that exceeds their assimilation capacity and poses health hazards; invasive species such as jellyfish; oil and other spills; and unsustainable use of natural resources such as overfishing. Though discharges in the basin have stabilised and for some key pollutants declined over the last decade, the pollution levels remain unacceptable, particularly for phenol, heavy metals and oil products. The severest pollution is found at the mouth of the Dnieper River, in the ports of Odesa, the Crimean towns of Alupka, Yalta and Hurzuf, and the Sevastopol Bay. International organisations are addressing this problem, in particular the EU TACIS Crimea Coastal Zone Management project of 2005-6 aims to improve the current water treatment systems in Yevpatoriya and Feodosiya. Environmental degradation, especially invasive species, has dramatically affected the once highly productive fisheries which, in the Sea of Azov, have dropped by 90% in recent decades.

Soviet-era agriculture placed considerable pressure on **biodiversity** in Ukraine, especially in steppe and wetland ecosystems. The system of **protected areas** has doubled since independence and now includes more than 30 reserves and national parks, and many smaller areas. However it only covers 4.6% of the land area, in comparison with the European average of 15% (protecting new areas often creates tension with local population, concerned that new regulations will impede access to traditional forms of land use[47]).

Ukrainian Carpathians

The Carpathian mountains form a 1,500 kilometre arc along the borders of Austria, the Czech Republic, Slovakia, Poland, Ukraine, Romania, Serbia and northern Hungary. Geographically the Carpathians are relatively old mountains covered with forest and grassland. The Carpathian region of Ukraine lies at its western extremity and comprises Zakarpatska, Ivano-Frankivsk, Lviv and Chernivtsi oblasts. It is of particular importance because it forms an ecologically rich border region with unique social and cultural attributes. The region is also economically significant, due to tourism and industry.

In 2003 the Carpathian countries signed the Convention on the Protection and Sustainable Development of the Carpathians thus acknowledging the region's special status, requiring additional efforts to protect and develop its assets. The first conference of the Convention parties presided by the Ukrainian Minister of the Environment was held in Kyiv in December 2006. The Conference resulted in the Memorandum between Carpathian and Alpine Conventions, as well as the Carpathian Declaration outlining key principles for international cooperation on sustainable development of the area. The Carpathian Convention and related regimes aim to counterbalance the increasing human impacts on fragile ecosystems and natural resources of this unique transboundary region.

Since 2000, there have been several accidental discharges of cyanide and heavy metals in Romania that eventually reached Ukraine and Hungary via the Tisza river. The worst of such spills occurred in 2000 at Baia Borsa and Baia Mare, Romania[48]. In 2004 and 2005 smaller spills occurred in Romania, with cyanide going into the Viseu River, a tributary of the Tisza. These accidents highlight the dangers inherent in gold mining technologies. The Carpathian gold reserves on both sides of the border (see e.g. Eurogold Ltd.) continue to attract investors and are likely to pose significant environmental risks unless investors and developers subscribe to best international practices, technologies and standards. Carpathian rivers are also threatened by other industrial accidents such as discharges from oil pipelines[48].

The frequency of floods, mudflows, land slides and avalanches in the region may be increasing with time, possibly affected by human activities such as forestry. Unlike other regions, floods can occur here not only in spring, but also in summer (after severe storms) and winter (after a sudden thaw caused by Mediterranean storms typical in the Tisza basin).

Many Carpathian rivers flood four or five times a year. Besides causing substantial economic losses, floods often trigger environmental problems, including soil erosion and chemical pollution of the water when industrial sites and facilities are affected. A number of international projects aim to reduce damage caused by natural disasters in the Carpathians.

Illegal logging driven by high unemployment and the absence of alternative sources of income in many parts of the Ukrainian Carpathians, especially Zakarpatska oblast in Ukraine, has become a common threat. Environmental NGOs in Ukraine have argued that corruption is also a factor in such trade. Though illegal logging has recently become less of a problem it still requires serious attention because the Carpathians are one of the few areas in Ukraine with valuable forests.

Other environmental problems typical to the rest of Ukraine affect the Carpathians too, such as environmental pressures from military facilities such as ammunition depots, airstrips and former missile sites. A number of military facilities and depots are currently being decommissioned in the Lviv, Chernivtsi, and Zakarpatska oblasts, causing environmental concerns described elsewhere in this chapter.

Given the extreme scarcity of arable land in the Carpathians, it is of particular concern that landfills occupy 5,000 hectares of arable land (2.6% of total), with 313 legal and more than 1,000 illegal dumps in the Zakarpatska oblast alone. There are about 540 tonnes of obsolete pesticides stored in the four Carpathian oblasts. This represents about 2.5% of all Ukrainian stocks but is located in a very sensitive area close to transboundary watercourses. For example until 2001 11 tonnes of pesticides were stored in the village of Sianky in the Lviv oblast. Pesticides were stored for 15 years in a rundown depot in the Nadsianskiy Park in the East Carpathians international biosphere reserve, 150 metres from a stream running into the Sian river, a tributary of the Wisla that flows towards the Baltic Sea through Poland. In 2001 the pesticides were repackaged in concrete containers but this has not prevented further leaks.

Illegal importing of toxic wastes, discussed in the main text, has specifically affected Lviv and Zakarpatska oblasts, with waste being dumped or stored in and around several villages and railway yards. The illegal movement of waste and timber is particularly difficult to control in the sparsely populated and mountainous regions.

Sources: Carpathian Convention secretariat (www.carpathian-convention.org/); UNEP Carpathian Environmental Outlook (www.grid.unep.ch/activities/assessment/KEO/index.php); ENVSEC (20054b); **Лига Бизнес Информ (2006);** Eurogold Ltd (www.eurogold.com.au/html/operations.html)

Water-related issues

- Water scarcity area
- Major discharges into transboundary water basins
- Poor water quality [1]
- Elevated flood risks, lack of flow control coordination or infrastructure
- Dams (safety or environmental impact concerns)

Energy and radiation issues

Areas exposed to high radioactive contamination due to the Chernobyl explosion:

- Caesium-137 activity above 555 kBq/m²
- Plutonium isotopes activity above 4 kBq/m²
- Nuclear power plants (operating / closed [2])
- Research reactors
- Radioactive waste storage sites (in use / considered) [3]
- Uranium tailing ponds (mining and milling waste)
- Black and brown coal deposits
- Oil fields
- Gas fields
- Oil refineries
- Gas processing plants
- Oil terminals (in use / considered)

Impact of defence activities and facilities

- Environmental concerns related to military areas (in use / closed)
- Storage of rocket fuel components (melange)
- Impact of navy activities

Other environmental issues

- Main industrial centres
- Highly polluted inland areas (air, soil and water)
- Highly polluted coastal areas

Storage of obsolete pesticides per oblast [4], tonnes:

- 500 to 1000
- Over one thousand
- Forest fires in Chernobyl-contaminated areas
- Documented traffic routes of hazardous waste [5]
- Storage of illegally imported hazardous waste [5]
- Illegal logging

Important nature [5]

- National parks, biosphere and strict nature reserves, other major protected areas, and their buffer zones
- Larger transboundary regions of high ecological importance

Land and territorial disputes

- Inter-state disputes in the process of international or bilateral resolution
- Inter-ethnic disputes

Environment and security issues in Ukraine

Map by UNEP/GRID-Arendal, May 2007.

Notes: 1 - National water pollution index above ten. 2 - The last Chernobyl reactor was stopped in 2000. 3 - Long-term storage of spent fuel, and military waste; other sites for low-level radioactive waste and short-term storage at nuclear power plants are not shown. 4 - Shown near oblast centres, not per specific locations. 5 - Refer to documented incidents and may only represent a small portion of the traffic. 6 - Only near-border nature areas are shown.

Sources: State Committee for Natural Resources. *Integrated Atlas of Ukraine*. Kyiv 2005; Ministry of Environment Protection of Ukraine. On-line environmental maps (www.menr.gov.ua); Baloga V.I. (ed.) *20 Years after Chornobyl Catastrophe. National Report of Ukraine*. Kyiv 2006; Shevchuk V.E. and V.L. Gurashevsky (eds.) *20 Years after the Chernobyl Catastrophe. National Report*. Minsk 2006. Hats I.A., Ministry of Defence of Ukraine: in materials for the *Environment and International Security* round-table. Minsk 2006; Bureau of Environmental Investigation, Lviv; ENVSEC consultations 2006-7.

Land and environmental concerns in the Crimean Peninsula

The Crimean peninsula is an autonomous region of Ukraine – with its Russian (58%), Ukrainian (24%) and Crimean Tatar (12%) population – and the locus of complicated social relations enmeshed with land, water, economic and environmental issues. Sevastopol is also the base of the strategically important Russian Black Sea fleet (see box).

From the Middle Ages to early modern times, the Crimean peninsula was the centre of the Crimean Khanate, a state of Crimean tatars and later a vassal power of the Ottoman Empire. Crimea became part of the Russian Empire in 1783 and the same year Russia founded the Black Sea fleet. The devastating Crimean War of 1853-56, coupled with persecution and confiscation of land, led to extensive migration by the indigenous Crimean Tatars, making them a minority in their land. Crimea was a battlefield in the Civil War of 1917-20, finally becoming part of the Russian Soviet Federative Socialist Republic. In 1944, after three years of German occupation, Stalin deported the entire Crimean Tatar population, claiming that they had collaborated with the Germans. In 1954, Khrushchev made Crimea part of Ukraine – formally to commemorate the 300th anniversary of Ukrainian-Russian union.

When the Soviet Union broke up the peninsula became part of the independent state of Ukraine. Crimean Tatars were allowed to return to their homeland in 1989 and now account for over 12% of the population (compared to 0.1% in 1979). Many of these returning groups have laid claim to land which they consider was unlawfully confiscated at the time of mass deportation. Land and other property disputes, including those related to access to water, are an important factor in Crimea. Such disputes (whose possible number in the future is estimated some 10,000 cases; UN Habitat) are exacerbated by the poor transparency affecting property and the lack of a public register of ownership. Together with continuing migration from the countryside towards Simferopol and the south coast, this adds to the difficulties of vulnerable groups making them a potentially recruiting ground for inter-ethnic conflicts.

A particular environmental aspect of land disputes in the Crimea is that allocating more land near unique, vulnerable ecosystems on the southern shore may conflict with the government priority of setting aside significant additional territories as national parks and other protected areas. Hence proper allowance for environmental concerns in development plans in the peninsula is very important.

Being a water-deficient area, Crimea depends on the reliability of inter-regional water transfer for its agriculture and households (please see the Water section).

Sources: Hopquin 2006; Касьяненко 2004; UNDP Office in Simferopol;UNHabitat;Подробности2006a;Мамчиц2006;Иванов 2006; Моя земля 2006, Версии 2006.

Ukraine has registered six protected areas with UNESCO. Two of these are transboundary biosphere reserves: the East Carpathians reserve covering parts of Poland, Slovakia and Ukraine, and the Danube reserve in the Danube delta jointly administered by Ukraine and Romania. Both reserves were set up in 1998 and aim to support sustainable development in their respective cross-border regions through integrated research and monitoring, public education, and land-use planning and management activities. In addition, reserves (including biosphere reserves) and national parks are located on the Ukrainian borders with Romania (in the Carpathians), Poland, Moldova, Belarus Polesie, Russia, and on the Black Sea coast, including Crimea. Furthermore several smaller protected areas are located in border areas. Ukraine is a party to the Convention on the Protection and Sustainable Development of the Carpathians which, among others, seeks to preserve Carpathian biodiversity (see box).

Ukraine harbours a considerable amount of **hazardous waste**, including more than 100 large and 5,000 small stockpiles of obsolete pesticides, amounting to nearly 20,000 tonnes (Mama-86 2006). Pesticide stockpiles began to accumulate in the 1970s and are largely stored in inadequately built, poorly guarded facilities in a deteriorating state of repair. There is no documentation for over 80% of the stockpiles, hindering accurate assessment of the risks to human health and the environment. Of the stockpiles for which the composition is known, 2,000 tonnes consist of persistent organic pollutants (mostly DDT) that pose a long-term danger to health and the environment. Although there are pesticide stockpiles all over Ukraine, most are concentrated in the Sumy, Kyiv, Kirovohrad, Zaporizhzhia, Dnipropitrovsk, Odesa, Vinnitsya, Kharkiv oblasts, and in Crimea. Considerable amounts are located in the basins of transboundary rivers or in areas close to borders (e.g. in the Carpathian region). More than 11,000 tonnes of hexachlorobenzene, another persistent organic pollutant, are stored in the Ivano-Frankivsk oblast, in the upper reaches of the Prut and Dniester rivers. In 2006 a GEF-supported integrated inventory was carried out and Ukraine drew up a plan of action for persistent organic pollutants **(МОНПСУ 2006)**. Assistance is also provided as part of bilateral support programmes, notably involving the US and Denmark.

Paradoxically, the application of stricter EU environmental standards on Ukraine's neighbours, Slovakia and Hungary, has resulted in numerous attempts to "export environmental problems" across their eastern border. Such reports were particularly common in the early 2000s, when allegedly toxic substances from Hungary were misleadingly labelled, exported to Ukraine and disposed of illegally (it has also been claimed that some of this waste was originally exported to Hungary from Western Europe). The mass media, government bodies and NGOs reported cases of **illegal importation of hazardous substances** in the Lviv, Sumy, Zakarpatska and Ivano-Frankivsk oblasts, attracting the attention of the Prosecutor-General's office and the Ukrainian Security Service.

Among the most notorious cases was the import of 1,500 tonnes of PREMIX (a hazardous ground-rubber compound) by the Hungarian firm ELTEX between 1999 and 2005. At present, more than 460 tonnes of PREMIX are being stored in 3,900 containers, about 340 tonnes being stored in a warehouse and the rest in cargo rail trucks at Borzhava and Berehove railway stations in the Zakarpatska oblast. About 32 tonnes of PREMIX are in the Zaporizhzhia oblast[49]. The same company also transported sawdust saturated with formaldehyde into Ukraine, as well as 1,600 tonnes of broken glass polluted with mercury. MOL, a major Hungarian oil company, transported boiler residues of maleic anhydride and acid tar into Ukraine in 2003-4. Now under investigation by the environmental prosecutor's office, the waste is being stored in freight trucks in Lviv and

Sumy oblast and no lasting solution has yet been found for it. MOL was also implicated in a previous case of acid tar import dating from 2002-3. Part of the substance was subsequently transported to the Transnistrian region of Moldova. Another Hungarian firm was responsible for shipping a toxic brown-coal mixture to Ukraine. There is also information on transporting toxic waste to Izmail via the Danube, and acid tar to Mykolaiv in the Carpathians. If these incidents are found to have violated the Basel Convention, to which both Ukraine and the EU are parties, the government may be legally justified in demanding that the waste be re-imported[50].

During the Soviet era Ukraine accounted for more than a quarter of the USSR's industrial output. Consequently, after independence, Ukraine inherited some of the most intensively polluting industries – chemicals, metallurgy and mining – concentrated in the **industrialised south-eastern part of the country,** particularly in the Donetsk, Dnipropetrovsk, Zaporizhzhia and Luhansk oblasts. Eastern Ukraine has the highest intensity of air pollution, particularly in Donetsk oblast (8.4 times the Ukrainian average and 3.7 times the Ukrainian average in terms of pollution per capita), Dnipropetrovsk oblast (respectively 4.2 and 3.0 times higher) and Luhansk oblast (2.4 and 2.1 times higher). There is significant pollution of surface and ground water (especially from the Kryvyi Rih industry). Obsolete technology, inadequate investment and lax enforcement of pollution control regulations have so far prevented Ukraine from adequately addressing this problem.

Selected registered cases of unauthorised import of hazardous substances to Ukraine

Composition, time period and quantity	Transportation route
PREMIX, 1999-2005, 500 to 4,000 tonnes	Hungary – Berehove – various places in the Zakarpatska oblast, part in the Zaporizhzhia oblast
Sawdust with formaldehyde, 3,146 tonnes; and allegedly broken glass, polluted with mercury, 2001-4	Hungary – Berehove (Zakarpatska oblast) – Horlivka (Donetsk oblast)
Boiler residues of maleic anhydride, 2003-4, 3,044 tonnes	Hungary – Drohobych (Lviv oblast)
Acid tar (brown coal mixed with heavy oil and clay, 2003-4, 2,996 tonnes	Hungary – Dobrotvir (Lviv oblast) – Zernovoye (Sumy oblast)
Acid tar, 2002-03, ca 17,000 tonnes	Hungary – Novyi Rozdil (Lviv oblast)
Acid tar, 2002-3, 982 tonnes	Hungary – Novyi Rozdil (Lviv oblast) – Ribnita (Moldova)
Acid tar, 2005, 2,500 tonnes	Hungary – Izmail (Odesa oblast) – Horlivka (Donetsk oblast)

Sources: Bureau of Environmental Investigation, Lviv; information from Ukrainian and international media

The serious environmental problems of the Donbas are in many ways linked to security problems. First of all, they negatively affect the quality of life and thus cause social tensions. Secondly, Donbas is the key to ensuring the energy security of Ukraine. This second issue has two aspects: the energy-intensive industries of Donbas depend on a reliable supply of affordable Russian fossil fuels; and Donbas coal deposits provide a sizeable share of Ukraine's energy balance. That share may be about to increase. International pressure to make the Donbas industry more environmentally friendly is likely to increase with worldwide concern over greenhouse gas emissions and climate change. There is consequently a clear need for international cooperation on solving the enmeshed energy, environmental and human safety problems in this region.

Policies and measures to promote **energy security** in Ukraine may have significant environmental implications. The government has produced a draft Energy Strategy of Ukraine up to 2030 (CMU 2006), approved by the cabinet in March 2006 and then a focus of vigorous debate among politicians, NGOs and the public. The strategy forecasts that the Ukrainian economy will triple in size in real terms by 2030, with a corresponding rise in primary energy consumption. To diversify its energy supply, Ukraine aims to develop domestic energy sources and technologies as far as possible. Possible sources include **nuclear** power, which currently accounts for 45% of Ukraine's electricity generation. As has already been pointed out, Ukraine is considering building new reactors to reduce fuel dependence. The location of new plants and their water supply remains an open question, with one obvious option on the coast of the Sea of Azov. If this location is indeed chosen, a number of environmental and related security issues ranging from the risk of rising sea level to concerns of the local population will need to be addressed.

Though there are plans regarding increased mining of uranium and zirconium (Mulvey 2006), the Ukrainian nuclear power industry still does not operate a complete technological cycle, sending spent fuel to Russia for reprocessing. Some of the by-products are bound to come back. Ukraine will consequently have to build its own depot for spent fuel. Several areas have been under consideration including the Chernobyl plant (TESEC 2006), which has already prompted concern in Belarus (see Belarus section). For its part Ukraine is concerned about the potential hazards associated with nuclear power facilities in Bulgaria, Hungary, Lithuania and Russia, as well as disposal sites for radioactive material in southern Belarus (**МНС 2006**). The radioactive contamination caused by the Chernobyl disaster still represents a serious environmental hazard (see box in the Regional context section). One specifically Ukrainian feature of the Chernobyl legacy is the safety of the concrete sarcophagus containing the wrecked "fourth module" of the exploded reactor.

One of the particular challenges of energy restructuring in Ukraine is reducing the role of **imported natural gas** in its energy balance. The main consumers of gas are metallurgy (13% of total), chemicals (10%) and electricity generation (9%). Gas purchases are the main component in the prime cost of Ukrainian metallurgy, averaging 12% of industry's total expenditure. This is mainly due to obsolete technology (44% of Ukrainian steel is smelted in Martin furnaces). However the situation is changing and by 2009 Ukrainian metallurgy plants plan to have invested $3.1 billion in modernisation. By 2007, metallurgy's share of gas consumption should have fallen to 10%. In particular the metallurgical sector has already started researching technologies for using a mixture based on coal dust, instead of natural gas; and coal mines are considering extracting methane, a by-product of mining. The energy generating sector has also already reacted to the change in the price of natural gas. Originally Ukrainian power stations were designed to run on coal, but until 2005 they were using mainly gas because of the low price and lower effect on equipment depreciation. From January to August 2006 power stations reduced gas consumption by 25%. New technologies enable gas consumption to be cut to a minimum level, using it only to ignite coal. For example at the Skhidenergo power company the share of gas is only 1% in the total fuel mix (**Дейкун и Пионтковская 2006).** Respectively, the new Energy Strategy calls for a significant increase in the use of domestic coal reserves, with in particular a doubling of coal-fuelled energy production. The eastern Donbas region is home to 98% of Ukraine's coal

Environmental and related problems in the Donbas

The Donbas (the name originates from DONetsk coal BASin) is a historic region that includes Donetsk and Luhansk oblasts of Ukraine which share an industrial infrastructure and economic interests. The region covers 60,000 square kilometres and is known for its rich deposits of coal and metals. Environmental issues in Donbas are closely interlinked with occupational safety, health, quality of life and other social and economic factors.

Under the Soviet Union, the Donbas region became a centre of industrialisation. To minimize transport costs, Soviet industrial planners concentrated in the region such industries as coal and iron mining, metallurgy, chemicals, machine production and military hardware production facilities. Nuclear power stations were subsequently built to meet the region's huge energy requirements. Donbas is closely associated with coal mining, which supported Soviet heavy industry for decades. Donetsk and Luhansk oblasts together produce 65% of Ukrainian coke, and are home to many steelworks. The Mittal Steel-Kryvyi Rih plant (formerly known as Kryvorizhstal') is located in the neighbouring Kryvyi Rih oblast.

In the period following the break-up of the Soviet Union, the Donbas region continued to be a centre of industrial production and coal mining, producing about 81% of Ukraine's coal. However, since the collapse of the Soviet Union, the sector has been in deep crisis. Coal production in Ukraine dropped from 154.8 million tonnes in 1990 to 78.4 million tonnes in 2005. This resulted in a wave of strikes and protests in the 1990s. The mining sector – which employs 450,000 workers – still experiences serious economic difficulties. The majority of pits survive thanks to state subsidies, with production costs several times higher than the world price of coal. This is partially a result of low productivity[51] and underinvestment. A significant proportion of Donbas mines have been operating without any refurbishment work for 20 years or more.

Such underinvestment also results in a host of safety and environmental problems. The Ukrainian coal mining sector is one of the most dangerous in the world. Since 1991 more than 4,700 workers have died in various accidents, equivalent to three deaths per million tonnes mined. In approximately 90% of all mines there are gas-related hazards. In 30% there is a risk of accidental release of coal and gas. The blast of coal release is a threat in 70% of mines, and in 30% of the pits spontaneous combustion of coal is a hazard. Yet their closure risks aggravating socio-economic problems and fuelling social tensions. Where production is being terminated (at 49 mines and 2 central concentrating plants as of the end of 2006), the existing legal framework does not allow assigning clear responsibilities for the adequate reclamation of damaged land; as a result, only 10% of the necessary land reclamation and tree planting is carried out (State Directorate for the Environment and Natural Resources).

The environmental consequences of industrial development in Donbas have been similarly severe. Among the region's most critical environmental problems is the pollution of surface (including river Siverskyi Donets) and ground water. At the end of the Soviet era about 150 square kilometres of aquifers had been contaminated, and toxic pollutants were commonly stored in unsecured ponds, where they could percolate into the ground. On at least one occasion hazardous pollutants from a chemical plant were dumped into ponds, percolating into a coal mine to a depth of about 600 metres, causing the death of three miners. Mineralised water from coal mines and municipal sewage is not treated before draining into surface water. Metallurgy

plants in the city of Mariupol (then Zhdanov) pump toxic waste water directly into the Sea of Azov, along with the untreated sewage from the city itself. During the first half of 2006 the level of hazardous industrial air pollution from stationary sources throughout Ukraine reached 2.4 million tonnes, an increase of 142,000 tonnes (6.2%) compared with the same period of 2005, according to the National Statistical Committee of Ukraine. Donetsk oblast is the leading source of industrial air pollutants, with 829,000 tonnes (more than 1,600,000 tonnes per year in 2005: **Третьяков 2006)**. Dnipropetrovsk oblast ranks second with 540,000 tonnes, with Luhansk oblast in third place with 255,000 tonnes. It should be finally mentioned that environmental impacts of coal mining and steel smelting in Donbas are of global nature since they significantly contribute to greenhouse gas emissions causing climate change.

Sources: Mnatsakanian (1992); The Associated Press, Donetsk, September 20, 2006; Kupchinsky (2005); **Третьяков (2006)**; National Statistical Committee of Ukraine; State Directorate for the Environment and Natural Resources of the Donetsk Oblast.

reserves, but mining and burning coal may further aggravate the already severe environmental damage to the region unless the relevant technology is thoroughly modernised (see box). Finally Ukraine is counting heavily on further oil and gas exploration, especially on the shelves of the Black Sea and Sea of Azov which will obviously increase environmental pressures on these vulnerable ecosystems.

Hydropower plants produce about 10% of Ukraine's electricity. Some specialists have recently expressed concern at the state of the Dnieper dams. According to these estimates, if the dam on the Kyiv water reservoir were accidentally damaged, flooding would affect an area occupied by up to 15 million people. To make matters worse, there is a risk that radioactive materials that accumulated in the sediment at the bottom of the reservoir after the Chernobyl disaster might then be released.

Military restructuring, particularly dealing with Soviet military legacy is closely connected to environmental issues. Ukraine inherited a huge Soviet military arsenal that must now be maintained or disposed of. Ukraine has approximately 2.5 million tonnes of Soviet-era ammunition that requires disposal. These include, some 55 shaft launchers, four burial grounds for radioactive waste, several missile fuel storage depots, arsenals, ammunition, and combustion and lubrication substances. Some 5% to 10% of waste disposal and pumping plants belonging to the national military require major repair. Major environmental impacts of the military complex include pollution of military sites with oil and lubricants, air pollution mainly due to more than 1,500 boiler-houses and contamination of domestic and international waters, primarily by naval forces(**YeremienkoandVozniuk2005,Гац2006**).At present Ukraine does not have sufficient capability, resources or funds to address these issues. NATO and various aid programmes are helping to tackle some of the issues, but there is still cause for concern about the security and technical maintenance of the massive stocks of weapons. Potential hazards associated with ammunition depots are exemplified by events in Novobohdanivka in May 2004[52].

Following the collapse of the Soviet Union, the Soviet army left about 16,300 tonnes of **mélange,** a

Key environment and security issues and interactions in Ukraine

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Illegal import of hazardous waste

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highly unstable, volatile, toxic oxidiser for rocket and missile fuel in Ukraine. It is stored at six facilities and poses a severe threat to human health and the environment in the event of leakage into groundwater or direct contact. Though not combustible, mélange reacts with water to produce heat, thereby causing a fire risk if suitable materials are nearby. In the event of a tank rupture, 100 cubic metres of mélange would be released into the environment where it might react with water producing a toxic cloud. The lives of people living within two kilometres of the spill would be at risk, with lower risks within a 25 kilometre radius. Wind could carry the toxic cloud as far as 80 kilometres. A major spill at the storage facility located less than 10 kilometres from the city of Vinnitsya in Central Ukraine, would endanger some 350,000 people. Leakage from mélange storage tanks suffering metal fatigue has been observed at almost all sites, and national efforts are insufficient. Prompt international timely assistance is therefore needed as the issue must be addressed immediately (OSCE 2005).

Moldova

The Republic of Moldova became an independent state on August 27, 1991 following the disintegration of the Soviet Union. After independence, Moldova began to implement economic and political reforms to create a democratic political system and a market economy. The Republic of Moldova is a parliamentary republic with a one-chamber Parliament. It is divided into 32 districts, five municipalities, the autonomous territorial region of Gagauzia and the administrative-territorial region located on the left bank of the Dniester River (known as Transnistria). Being a small country closely tied to the rest of the Soviet economy, Moldova had suffered a great deal from the disintegration of the USSR. The situation is aggravated by the protracted conflict over the Transnistrian region where a significant part of the economic potential of the country is located. Cooperation with the European Union remains a consistent policy of Moldova's government.

Background

The Republic of Moldova[53] is a small state (covering 33,800 square kilometres) bordered in the south, east and north by Ukraine and in the west by Romania. The country has no direct access to the Black Sea but has the right to use the lower reaches of the Danube and thereby a potential connection to sea traffic. Moldova has relatively few natural resources. Almost all of its energy is imported. The country's main natural asset is its fertile black soil and a temperate continental climate, both of which are conducive to agriculture.

In January 2006 the Republic of Moldova had a population of almost 3.4 million, excluding Transnistria with its additional 1 million inhabitants. According to the 2004 census, Moldovans make up 75.8% of the population. Ukrainians accounted for 8.4% of the population, and Russians for 5.8%. The Gagauz minority which mainly lives in a compact administrative autonomous region in southern Moldova makes up 4.4% of the population and Bulgarians 1.9%. Over 61% of the population lives in rural areas making Moldova the European country with the highest share of rural population.

From 1991 to 1999 the Republic of Moldova suffered a severe economic downturn, with its output shrinking by 65% in real terms. From 2000 to 2005 there was remarkable growth in GDP ranging from 2.1% to 7.8% per year. Economic growth has been led by consumption financed by, among other things, Moldovan migrants' remittances. According to official statistics, there were about 394,000 people working or looking for work abroad in 2005, 14% more than in 2004. Most observers believe that the true number of Moldovans working abroad, mainly in Western Europe and Russia, is much higher. Officially, remittances from migrants in 2005 accounted for 30% of the GDP, but unofficial estimates put them as high as $1 billion annually, twice the state budget for 2004 (Radio Free Europe, 2004). However, Moldova is still the poorest country in Europe with $2,377 GDP (in purchasing power parity) per capita. In 2004 the country adopted its Economic Growth and Poverty Reduction Strategy Paper which was endorsed by the International Monetary Fund and the World Bank contributing to unfreezing financial relations of the country with both international financial institutions.

Moldova is a small open economy with international trade exceeding 150% of its GDP, and a WTO member from 2004. It is highly dependent on the agricultural sector which employs more than 40% of the labour force – many times the European average - but contributes only 14.3% of the GDP (2005). Some 80% of Moldovan territory is farmed including vineyards and orchards. Industry and construction provide 20.5% of the GDP and the remaining 50% of GDP is accounted for by the service sector. The Transnistrian region[54] in the east of the country is the most industrially developed in Moldova. Home to the majority of large industrial facilities (more than 100), including steel works and the largest power stations, it produced about 40% of GDP in the early 1990s[55].

Security issues and priorities

European integration is an overarching policy goal for Moldova. It considers the EU as the major political, economic and security partner and OSCE as the primary framework for political dialogue on security matters. Moldova supports the development of the European Security Strategy and wants to play a larger part in it. Moldova was one of the first CIS countries to sign a Partnership and Cooperation Agreement with the EU in 1994. Moldova also became the first former Soviet Republic to join the Council of Europe, in 1995. In 1994, it joined the NATO's Partnership for Peace Initiative. Moldova is an active participant in the European Neighbourhood Policy and has agreed with the EU on a joint Action Plan. In 2002 it joined the Southeast Europe Stability Pact. Moldova is keen to conclude an Association Agreement with the EU after implementing the provisions of the ENP Action Plan signed in 2005. The goal of the Plan is to strengthen political, security, economic and cultural relations, reinforce cross-border cooperation and establish a joint responsibility regarding the prevention and settlement of conflicts.

Moldova joined the Commonwealth of Independent States in 1994 and is a member of the Organization for Democracy and Economic Development – GUAM. Moldova is also a member of the WTO, the World Bank, the International Monetary Fund and the European Bank for Reconstruction and Development.

Moldova has strong historic and cultural ties to Romania, and the Moldovan language is very close to Romanian. However the results of the 2004 census show that an overwhelming majority of Moldovan people do not consider themselves Romanians. Although during the early 1990s it was thought likely the two countries would unite, expectations soon faded. Nevertheless Romania takes a close interest in Moldovan domestic affairs, especially its problems of energy dependence and the Transnistrian conflict. In 1992, Moldova and Romania started negotiations on inter-state political and border treaties. Both treaties were prepared for signing in 2000, but they have yet to be approved by the Romanian government. The recent statements and decisions by Moldovan government signal an affirmation of the country's intention to conduct foreign and domestic policy independently from its western neighbour[56].

Separatism in the eastern region of Transnistria (see box) which makes up 11% of the territory and 14% of the population of Moldova, represents one of the most acute security problems. The de-facto authorities of the self-proclaimed "Transnistrian Moldavian Republic" assert that the region has clear cut geographic and political frontiers (the Dniester river and the constitutional frontier of the Republic of Moldova with Ukraine), as well as a historic legacy that is distinct from that of the territory on the right bank of the Dniester. Though there has been no fighting since 1992, a political solution to the conflict has not yet been found. However the level of tensions is declining, the transformation of the current military peace-keeping mechanism into a multinational peace operation under an appropriate international mandate (large civilian component and military observers) is already on the agenda of the conflict settlement talks. Reintegrating Transnistria is the top priority for the government of Moldova. In 2002 it appointed a Minister of Re-integration to coordinate the work of other government departments in this area and conduct negotiations with representatives of Transnistria.

The Transnistrian conflict significantly complicates Moldova's relations with the Russian Federation. The government considers that Russia – whose army is still stationed in the Transnistrian region without a legal agreement with Moldova – is not doing enough to facilitate the settlement, and is supporting the separatist authorities politically and economically. Moscow maintains that it intends to play a role in the settlement, publicly justified by the concern it has expressed over the Russian-speaking population of the Transnistrian region[57]. In March 2006 Russia imposed a ban on the import of Moldovan wines (according to the Russian sanitary authorities, based on the high pesticide and heavy-metal content) which significantly threatened the predominantly agrarian economy of the country, which exports 85% of its wine production to Russia (Moldova.org 2006). This ban was formally lifted following a meeting between Presidents Voronin and Putin at the end of 2006[58].

The relationship with Ukraine is of particular importance to Moldova due to their extensive land border, shared infrastructure and watercourses. Both countries are members of GUAM and share many security priorities including European integration. An example of specific security cooperation is their recent joint effort to regulate imports and exports (including from the Transnistrian region) on the Moldo-Ukrainian border (see box). These actions are supported by EU Border Assistance Mission deployed in both countries from December 2005[59]. At the same time the two countries are engaged in solving complex transboundary issues, such as the construction of Moldovan oil terminal at Giurgiulesti (see box on the Danube delta in the Ukraine section).

Energy self-sufficiency is a key national security priority for Moldova. The country imports 98% of its energy (70% of which is Russian natural gas) and the energy intensity of its economy is three to four times higher than the world average. The situation is complicated by the poorly developed energy infrastructure (power stations and transmission lines). The largest power plants – the Moldovan GRES power-plant (2.5 million kWt) and the Dubasari hydro-power plant (48,000 kWt) – are located in the Transnistrian region and are heavily depreciated. Energy costs exceed one-third of GDP. Government policy aims to increase energy self-sufficiency through energy saving, diversification of supply and construction of domestic electricity generation facilities. To achieve energy security, the priority is to integrate the energy complex with the European system.

Transnistrian conflict

From 1989 onwards, parts of the population of Transnistria resisted Moldovan independence efforts and particularly increased use of the Romanian language. In response to Moldova's Declaration of Independence in 1990, they announced the formation of the so-called "Transnistrian Moldavian Republic" starting a conflict with the rest of Moldova which has lasted until now. Contrary to what is sometimes claimed, the roots of the Transnistrian conflict are political and economic, and not ethnic.

Tensions escalated until a large-scale outburst in the summer of 1992. Much of the fighting took place in and around Tighina (Bender). The fighting resulted in approximately 1,000 deaths and 130,000 people either internally displaced or seeking refuge in other countries. On 21 July 1992, the fighting ended and an agreement was signed between the Republic of Moldova and the Russian Federation (as opposed to the Transnistrians) on the basis of a peaceful solution of the armed conflict. The agreement provided for an immediate ceasefire and the creation of a demilitarised security zone between the parties. A trilateral peace-keeping force, comprising Russian, Moldovan and Transnistrian battalions, began deployment on 29 July 1992.

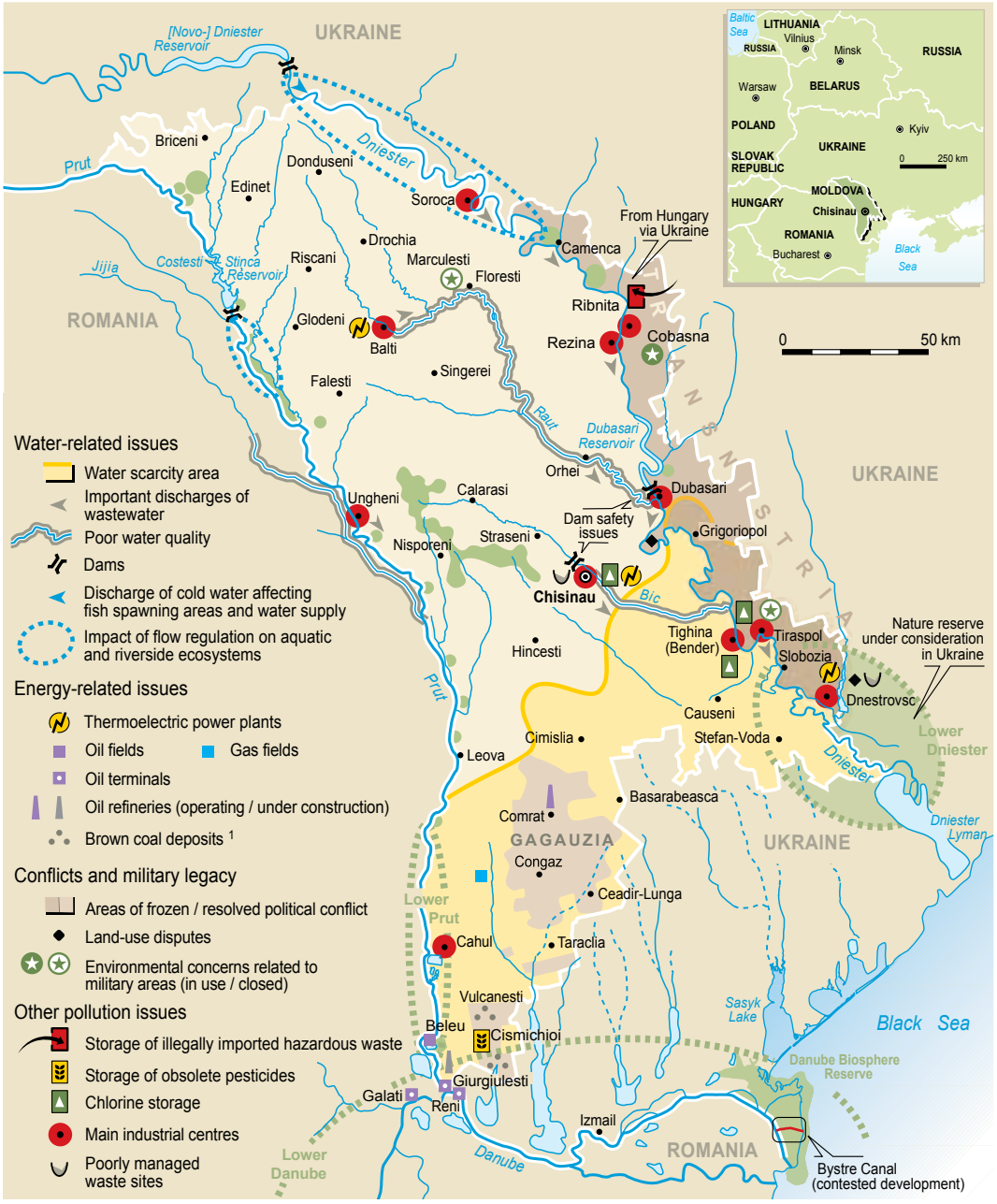
During 1993-2005 the negotiations over political settlement focused on the issue of status of the Transnistrian region within the Republic of Moldova. The negotiation format evolved from the "five-sided" (Chisinau, Tiraspol, Russia, Ukraine, OSCE) to the "5+2" format (adding EU and US as observers from October 2005).

Under the Moscow Agreement, and at the 1999 OSCE Istanbul summit, Russia agreed to withdraw its armed forces and munitions from Moldova. However, negotiations on a corresponding timetable have not been successful.

The environmental issues relevant to the Transnistrian conflict include the potential for unregulated air and water pollution from the Transnistrian region, and stocks of waste and pesticides on the left bank of the Dniester. The dialogue over environmental management and monitoring included rounds of talks resulting in "protocol decisions" on joint actions in the field of environmental protection and use of natural resources (Chisinau, 13 July 1999); geological exploration (Chisinau, 13 July 1999); environmental protection and use of natural resources (Tiraspol, 8 August 2001); and the protocol of consultations on integrated use of the Cuciurgan reservoir (Cuciurgan, 21 June 2001). However further advances in this field could hardly be achieved without progress in the political conflict settlement negotiations. Environmental NGOs are cooperating on numerous projects across the border, including water-quality monitoring projects in the Dniester Basin as well as a pesticide inventory for the territory of the Transnistrian region of Moldova.

Sources: Löwenhardt (2004); Le Monde diplomatique (2006); Haukkala and Moshes (2004); **Игнатьев (2006)**; NYC Bar Association (2005); Ministry of Foreign Affairs of the Republic of Moldova; online media sources.

Environment and security issues in Moldova



Important nature — Major protected areas [2] — Larger transboundary regions of high ecological importance

Notes: 1 - Deep unexploited deposits. 2 - Only selected near-border areas are shown.

Map by UNEP/GRID-Arendal, May 2007.

Sources: Botnaru V. and O. Kazantseva. *Republic of Moldova. Atlas.* Chisinau 2005; World Bank and GEF. *The Republic of Moldova. Ecological state* and *The Republic of Moldova. Persistent organic pollutants.* Chisinau, 2004; Institute of Geography of the Academy of Sciences of Moldova, Chisinau; Bureau of Environmental Investigation, Lviv; ENVSEC consultations 2006-7.

Environment and security challenges

Since **water resources** are of particular importance to Moldova, water pollution is viewed as a nationally significant threat. Moldova does not have large lakes, and all its larger rivers originate outside its borders. The major rivers – the Prut and Dniester – are sources of drinking water (the latter supplying Chisinau) and irrigation, as well as being used for navigation, fishing and energy production. Most of the accessible groundwater is hydrologically connected to the largest river, the Dniester, and as much as half of this groundwater is contaminated above the standards. By official standards both the Dniester and the Prut are moderately polluted. The Reut and Bic rivers are classified as "polluted", and most small rivers as "very polluted". The pollution level of surface water is close to or exceeds maximal permissible concentrations for almost all pollutants including ammonia, nitrites, copper, phenols and oil products. The deteriorating infrastructure – in the Transnistrian region up to one-third of water is lost in distribution networks – hampers the supply of drinking water. Malfunctioning wastewater treatment plants, farming and industrial accidents cause water pollution. At the same time, a significant amount of water pollution originates in neighbouring countries.

The 1,362 km-long Dniester is the largest river in this part of the region, originating in the Carpathian mountains in Western Ukraine, flowing through Moldova, and entering the Black Sea in the Odesa oblast of Ukraine. Some 70% of the water in the Dniester rises in the industrially developed oblasts of Ukraine, home to some 5 million people, including Lviv and Ivano-Frankivsk. Discharge from mining and industrial facilities, and the possibility of industrial accidents, give rise to serious concern. About 90% of Ukrainian pollution enters the Dniester in its upper reaches from the Tysmenytsya, Nichlava, Seret, Bystrytsya and Svicha rivers. Inside Moldova the most significant change is visible close to Dubasari, downstream of the Reut river. Another tributary, the Bic that receives waste water from the capital Chisinau, is also heavily polluted[60]. A number of municipal waste-water treatment systems do not work at all. In the northern city of Soroca they have not operated since 2002, and sewage is discharged into the Dniester without any treatment. The Ribnita cement plant and Moldovan GRES power plant as well as other industrial facilities in the Transnistrian region cause substantial pollution too. Significant amounts of chlorine compounds are stored in Chisinau and on the territory of the Transnistrian region. If accidentally released into the environment these chemicals would pose a substantial threat to the quality of the Dniester's water **(Голубева 2004)**. On the lower reaches of the river, chemical and microbiological pollution carried from Moldova into Ukraine causes serious concerns about the quality of the drinking water supply for Odesa, a city of two million people.

Construction of power stations, with the Dubasari reservoir in Moldova (1954) and the (Novo-)Dniester reservoir upstream in Ukraine (1981), has affected the hydrological regime and ecosystem of the river and adjacent areas. The Dniester reservoir also significantly alters the temperature regime of the stretch of the river in Moldova, and the planned addition of a pumped storage unit there has recently been the subject of intense cross-border debate.

Moldova's second largest river, the Prut, also rises in the Ukrainian Carpathians, flowing along the Moldova-Romania border to reach the Danube at Galati, Romania. Much as the Dniester, the Prut suffers from upstream water pollution (including from the severely polluted Jijia river, which enters it from Romania). Irreversible transformation of natural systems has been observed downstream from the transboundary Stinca-Costesti reservoir.

Although it only has access to a stretch of the Danube about 400 metres long, Moldovan economic development in the area has been a topic for international debate. Moldova wants to boost foreign trade, stimulate development of its southern region and increase its energy security by building the Giurgiulesti petroleum terminal at the junction of the Prut and the Danube. The terminal started operating in October 2006 and may be upgraded to receive passenger traffic in the future. Ukraine has challenged this project, among others on account of the threat it poses to the Danube delta (see box in the Ukraine section). Ongoing oil prospecting in the Beleu lake located in a scientific reserve

Environmental cooperation agreements between Moldova and its neighbours

With Ukraine	With Romania
On protection and joint use of transboundary waters (1993)	On environmental protection and sustainable use of natural resources (1997)
Plan of joint activities on protection and use of water biota in transboundary water courses (endorsed in 2006)	On protection of fish and fishery in the Prut river basin and in Stinca-Costesti reservoir (2003)
Inter-governmental programme of the long-term economic cooperation through 1998-2007 (1998)	
On cooperation in managing specially protected territories in the Danube delta and the Lower Prut	

in southern Moldova raises environmental concerns at home too.

Moldova cooperates with its neighbours on joint management of the Dniester and Prut water resources (see table), in particular with the support of the international community (see account of Dniester basin cooperation in the Ukraine section). Cooperation with NATO and Germany[61] is enhancing much needed early warning and monitoring systems[62]. Tri-partite cooperation (with Ukraine and Romania) on the joint management and protection of the Danube delta has also started.

Protected natural areas. At present protected areas cover 1.96% of the total land surface of Moldova (**MOCTY 2000)**. More than half this area is in nature reserves. In the late 1990s there was an attempt to create a 20,000 hectare Lower Dniester national park. It would have been connected to a projected national park in Ukraine's Odesa oblast, creating a transboundary protected area. The World Bank was due to fund the project but suspended its support in 2005 due to problems of procedure and the legal status of the territory (doubts as to whether a game reserve can be part of a protected area) (Biotica 2003). Meanwhile a feasibility study for the Lower Dniester National Park in Ukraine has started with the support of the European Union.

Productive land is a key resource in the Moldovan economy, with farming earning more than 75% of national income. Land degradation is therefore seen as a significant economic and social threat potentially associated with massive loss of rural livelihoods, migration and unemployment. More than half of all farmland (35% in the Transnistrian region) is currently considered to be deteriorating and the amount of land affected by serious soil erosion is increasing by almost 1% a year. In particular, water erosion affects about 35% to 40% of land, and almost 30% are prone to land slides. There are more than 40,000 ravines in the country and the area affected by landslides and ravines is increasing by 3% to 7% a year. The Transnistrian conflict complicates use of farmland in the area south of Dubasari, where local people on the right bank must cross the demarcation line of contact every day to reach the land they traditionally farm.

Hazardous waste is of particular concern to Moldova, especially due to its low capacity to address the problem. The country does not have a single suitable facility to dispose of about 8,000 tonnes of toxic waste that has accumulated there. Significant amounts of waste are stored illegally and in a disorganised fashion, contributing to land and water contamination. In the Transnistrian region industrial and domestic waste has been and still is being dumped at about 100 locations, most of them illegal. Landfills in Tiraspol, Tighina (Bender) and Slobozia are full. The one in Ribnita is nearly full. Up to 1 million tonnes of industrial waste are temporarily stored at various facilities and an estimated 4,700 tonnes of toxic waste has accumulated in the Transnistrian region. Operation of the Moldovan GRES thermal power plant has produced more than 13 million tonnes of waste, which is still building up (for historical reasons this waste is stored on the other side of the Cuciurgan Reservoir in Ukraine, border

demarcation along the reservoir never having been completed). Toxic substances are also stored at the Ribnita cement plant, reportedly containing toxic waste imported from Europe (see Ukraine section).

Up to 3,000 tonnes of pesticides were stored until recently at 340 locations, posing a risk of transboundary contamination. They are now being inventoried and repackaged with the help of the World Bank and NATO for subsequent transfer to safer locations and disposal. The biggest organised depot (currently about 4,000 tonnes) is at Cismichioi in the south, not far from the Danube. In Transnistria about 147 tonnes of unidentified, out-of-date pesticides are stored at 105 locations, 70% of which are unsuitable[63]. The situation is complicated by the fact that there is no list of approved pesticides in the Transnistrian region.

As is the case elsewhere abandoned **military facilities** raise environmental problems. A former airbase at Marculesti is one of the places where study is required to determine the current extent of oil and lubricant pollution and the hazards for the environment and human health. Another similar location is Blijnii Hutor in the Transnistrian region (Catrinescu and Calasnic 1998).

Moldova is especially concerned about potential environment and security hazards associated with the Russian army depot at Cobasna railway station in the Transnistrian region, close to Ribnita. According to a report by the Moldovan Academy of Sciences in 2000, weapons and ammunition stockpiles at the station amount to 42,000 tonnes. The OSCE estimates that, with its support, about 50% of this materiel was transported from Moldova or destroyed between 2000 and 2004. The remaining stockpiles of about 20,000 tonnes cover about 1 square kilometre and a part of it cannot be transported. They should be destroyed in situ. The simultaneous explosion of such large quantities of ammunition may trigger an environmental and humanitarian disaster[64].

Moldova's **environmental institutions** are smaller than in other countries (the Ministry of Environment in Chisinau only has a staff of 25. But they have made a sustained effort to attract international attention and funding to address the country's environmental problems. Most of the ministry's funding derives from the National Environmental Fund rather than from direct appropriations, and total expenditure for environmental protection only amounted to $2.7 million in 2004. In addition to the staff at ministry headquarters, Moldova employs 280 environmental inspectors and a small number of additional personnel in environment-related agencies such as the Agency of Geology and the Hydro-meteorological Service.

The EU-Moldova Action plan, drawn up as part of the EU Neighbourhood Policy, calls for the gradual harmonisation of Moldova's laws with the EU acquis communautaire. Consequently, harmonisation of environmental laws with those of the EU has become the top priority for the country. The Ministry of Environment prepared an action plan for harmonisation that was, in principle, positively received in Brussels, but was sent back to Moldova on the grounds that it was too ambitious and could not be implemented. Moldova subsequently selected priority areas for action, including framework environmental legislation, a legal framework for environmental impact assessment and laws related to compliance with the Aarhus Convention.

Environmental security is discussed at meetings of the High Security Council by the President of Moldova, and embodied in key documents such as the Concept of Environmental Policy of Moldova (2001), the National Waste Utilisation Programme (2000), the Environmental Security Action Plan (2003), the National Water Resources Policy 2003-10 (2003), the National Action Plan on POPs Reduction (2004)[65]. A national Environmental Security Programme for the period of up to 2015 has been recently prepared.

Key environment and security issues and interactions in Moldova

<table>
<tr><th>Security
Environment</th><th>Promoting energy security</th><th>External relations</th><th>Settlement of the Transnistrian conflict</th><th>Military restructuring</th></tr>
<tr><td rowspan="2">Hazardous sites and facilities</td><td></td><td>Pesticide stockpiles</td><td colspan="2">Cobasna ammunition depot</td></tr>
<tr><td colspan="3">Pollution and waste from the Moldovan GRES</td><td rowspan="4">Pollution issues at (former) airbases</td></tr>
<tr><td rowspan="3">Water management</td><td>Danube delta management issues, Giurgiulesti terminal and refinery</td><td colspan="2">Transnistrian industrial pollution</td></tr>
<tr><td></td><td>Transboundary pollution of the Prut</td><td></td></tr>
<tr><td rowspan="2">Impacts of power reservoirs on water quality and terrestrial ecosystems (Dniester, Stinca - Costesti, Cuciurgan)</td><td colspan="2">Pollution and management of the Dniester</td></tr>
<tr><td rowspan="2">Ecosystems management and biodiversity protection</td><td colspan="2">Transboundary protected areas (including those in the lower Dniester)</td><td rowspan="2"></td></tr>
<tr><td>Environmental impacts of domestic oil production at Beleu</td><td>Regionally coordinated network of protected areas</td><td>Local land disputes</td></tr>
</table>

Looking ahead

What has the coming day in store?

Before taking stock and proceeding to immediate plans and actions for the environment and security, let us first try to conceive a long-term outlook for the region and pinpoint some major trends.

Over the next decade, and perhaps for longer, the region will continue to face tough challenges modernising its economy and radically reforming its energy systems, while building sustainable democratic societies. Analysts have argued that such simultaneous political and economic transformation is only possible with strong external stimulus and support[66] of the type provided by the EU to its candidate countries in Central Europe and the Baltic States. Yet the EU, with its current "enlargement fatigue", has certain constraints in helping in a substantial way. The countries consequently have a long way to go before state institutions mature and a culture of dialogue and democratic representation is firmly established, a necessary precondition for developing long-term solutions to strategic challenges, including those related to the environment. Unless they are at least partly resolved, for example the tensions such as those found in Moldova's Transnistrian region or, security-linked social issues in Crimea will work against stabilisation and democratic transition.

The most dramatic internal factor in the long term is probably the demographic situation. Ailing, ageing and shrinking populations will be increasingly unable to shoulder the burden of social transformation and economic modernisation. Under the circumstances the most active part of the population will go on looking for a better future outside the region, further restricting the potential of the countries. While these processes are difficult to stop, efficient, legitimate, and capable national elites could limit the damage by modernising education and health care and boosting family-friendly social security measures. Solving environmental problems in each country, and particularly in socially stressed areas,

though perhaps not decisive, would certainly contribute to this process.

The single most important external factor shaping the future security of Eastern Europe is the interplay of political and economic interests in the pan-European region. Many in Eastern Europe are attracted by Western models, but drawn East by historic, cultural and linguistic affinities, and, last but not least, by close trade and energy links. Most probably the three countries of Eastern Europe will continue to search for a balance between the two poles. However, the three states themselves are not passive objects in a geopolitical game, but active players, and much of the regional security architecture will depend on the ability of Chisinau, Kyiv, Minsk and other capitals to seek mutual understanding and reach compromises.

How does this affect interaction between environment and security? We still do not know whether Eastern European economies will stagnate, decline or grow, and if so in what way; nor whether growth will be based on resource- and energy-intensive industries, or technology- and labour-intensive activities and services. Nor is it clear how continuing transition will define the political landscape of the three countries. But these factors will certainly feature among the forces defining the environmental agenda in the region, influenced in their turn by environmental and security limitations.

Overview of environment and security issues in Eastern Europe

<table>
<tr><th></th><th>Belarus</th><th>Ukraine</th><th>Moldova</th></tr>
<tr><td rowspan="4">Pollution, use and development of shared resources</td><td rowspan="2">Pollution and management of the Neman and Z. Dvina rivers, Drysviaty and Braslav lake basins [abc]

Protection of biodiversity in the Belovezhskaya Pushcha [b]</td><td colspan="2">Pollution and management of the Dniester, Prut and Danube basins, the Black Sea [abc]

Protection of biodiversity in the lower Dniester basin [ab]</td></tr>
<tr><td>Pollution in the Tisza basin, protection of Carpathian biodiversity [ab]

Pollution and management of the Sea of Azov [abc]

Land and water disputes in Crimea [ab]</td><td rowspan="2">Land disputes in Transnistria [a]</td></tr>
<tr><td colspan="2">Pollution and management of the Z. Bug, Dnieper and Pripyat river basins, Polesie marshlands [(a)b]

Pripyat flood control; managing levels of the Dnieper-Bug canal and the Shatsk Lakes [(a)b]</td></tr>
<tr><td colspan="3">Protection of natural areas near borders, creation of ecological networks and corridors [b]</td></tr>
<tr><td rowspan="3">Threats to security from specific pollution and waste sources, and the environmental impacts of security policies</td><td colspan="2">Radioactive pollution and waste [abc]</td><td></td></tr>
<tr><td></td><td colspan="2">Illegal import of hazardous waste [a]</td></tr>
<tr><td colspan="3">Toxic waste including stockpiles of obsolete and banned pesticides [ab(c)]

Risk of cross-border environmental impact of industrial accidents [abc]

Environmental impacts of energy sources and infrastructure [a(b)c]

Pollution and risk of accidents related to past and current defence activities [(ab)c]</td></tr>
<tr><td rowspan="2">Areas with overlapping environmental and security issues</td><td colspan="2">Chernobyl-affected areas [abc]</td><td rowspan="2">Transnistria [abc]</td></tr>
<tr><td>Soligorsk area [ab]
Braslav lakes [abc]</td><td>Donbas [(a)bc]
Crimea [ab]
Carpathian region [ab]</td></tr>
</table>

[a] security implications of environmental issues;
[b] security and stability benefits of environmental management and cooperation;
[c] environmental implications of security measures.

There is obviously an urgent need to mitigate threats and strengthen cooperation on Eastern Europe's external and internal borders. The widest range of measures will inevitably be used to enhance dialogue in the region's concerned areas. Finally future generations will not forgive us if we sacrifice the environment to the short-term political, defence or energy concerns of the early twenty-first century.

International institutions can make a meaningful contribution by easing tension, solving environmental problems, supporting energy security, boosting regional stability and promoting stewardship of global ecosystems – but to do so they must cooperate with one another systematically in a drive to untangle the complex web of relationships between energy, security and the environment.

Revisiting issues – the ENVSEC response

Returning to the many forms of interaction between environmental and security issues in Eastern Europe cited in this report, we can to a broad range of specific challenges and opportunuties (see box, table, and the map of priority areas on page 34).

The identified concerns call for a comprehensive, systematic response. The Environment and Security initiative is only one contributor whose inputs and effectiveness will depend primarily on the strength, expertise and comparative advantages of its partner organisation and national counterparts. On the basis of these factors, of partner organisations' ongoing activities, and of the three countries' own priorities expressed throughout the assessment and consultations, ENVSEC has identified first-line activities for the near future.

At the broadest level, the initiative will address problems common to **the entire region**, such as analysing the environmental implications of energy security to help countries find ways of optimising the environmental impacts of achieving a secure energy supply. ENVSEC partners will expand their work identifying stocks of, and risks from, obsolete pesticides, one of the most widely dispersed categories of hazardous waste. Concrete aims will be mitigation of risks from pesticide pollution in Moldova and areas that are sensitive or near borders in Belarus or Ukraine. Gradual building of public and media awareness of the impact of environmental problems on security and human development will support ENVSEC interventions as a whole.

At a **bilateral level** ENVSEC will address general strategic issues and specific concerns in the Z. Dvina / Daugava, Neman, Pripyat, Dniester and Danube basins, complementing a large body of national and international efforts such as those by the EU and GEF. Assessment and support for cross-border management of the Lake Drysviaty area is an example of activity on a smaller scale geographically. Conventions are ideal instruments for resolving environmental disputes, and ENVSEC will promote their application to concrete situations (e.g. in the Danube delta and Polesie). ENVSEC will also aim to help the region strengthen mechanisms for the prevention of industrial accidents.

Interventions at the **national level** will address specific risk factors as much as overall institutional needs. ENVSEC intends to provide support in various ways: for Moldova, to develop and implement its environmental security strategy and priority actions arising from this document; for Ukraine to combat illegal imports of hazardous waste, to mobilise resources to dispose of toxic components of rocket fuel, and to enhance the armed forces' environmental performance; for Belarus to study present-day radioactive contamination in Polesie, and to engage the public in planning hydropower development.

At the **local level** attention will be paid to Transnistria in Moldova, with a view to contributing to conflict resolution by improving environmental protection

Clusters of interaction between environmental and security issues in Eastern Europe

Mitigating the security implications of environmental problems. In a number of cases environmental hazards or disputes over usage of natural resources complicate relations between states or communities, sometimes already plagued with tensions. These include Belarus anxiety about potential cross-border environmental hazards arising from activities at the Ignalina (Lithuania) and Chernobyl nuclear facilities and Ukraine's concerns over imports of hazardous waste. Other examples include the potentially conflicting use of transboundary bodies of water such as the Z. Dvina / Daugava (Belarus - Latvia), Pripyat (Belarus - Ukraine), Dniester (Ukraine - Moldova including Transnistria), the Danube delta (Ukraine, Romania and Moldova), the Sea of Azov (Ukraine and Russia) and the Black Sea. Environmental issues affect not only external but also internal security. Most notably, local conflicts over land are complicating ethnic and political disputes in Transnistria. Widespread environmental degradation is potentially linked to security-charged social issues in areas such as Donbas; environmental contamination, land degradation and poor access to safe water pose problems in rural areas in all three countries.

Security and stability benefiting from effective environmental management and cooperation. There are many examples of productive environmental cooperation with potential security benefits in Eastern Europe, but many more opportunities exist. Cooperation between countries can be extended with regards to joint management of transboundary water resources (Pripyat, Dniester, Lake Drysviaty, Danube delta), and collaboration on monitoring and management of hazardous sites and facilities (Ignalina, Chernobyl). Another example of such opportunities is joint operation of cross-border protected areas such as those on the Belarus-Poland-Ukraine and Ukraine-Moldova borders and in the Carpathians. Cooperation on development of protected territories can also be expanded at the national level to ensure that environmental networks or corridors are compatible and linked to one another. In areas suffering from frequently enmeshed social, economic and environmental pressures, effective environmental intervention contributes to decreasing risks of instability (mining and industrial areas in Belarus and Ukraine). Soft environmental cooperation helps strengthen relations too, amidst tension over more pressing issues, as may be the case with Transnistria.

Addressing the environmental implications of security measures. Peacetime military activities and military restructuring affect the environment in various ways. Stockpiles of unspent missile fuel, former and operational military facilities, ammunition depots such as Cobasna in Moldova and Novobohdanivka in Ukraine are examples of serious security concerns. Similarly, measures to promote energy security may have diverse and significant environmental impacts: while increased energy efficiency and some renewable energy technologies result in environmental benefits, replacing imported energy with domestic sources is likely to result in adverse impacts on ecosystems.

Environment and Security work programme for Eastern Europe (2007-09): first-line project activities

Focus areas and projects	Implementation		ENVSEC pillars			
	Lead organisations	Countries of operation	Assessment	Capacity building	Policy development	Risk reduction
Management of shared environmental resources						
Transboundary cooperation and sustainable management in the Dniester river basin	UNECE OSCE UNEP	MD, UA	*	*	*	
Real-time monitoring and decision support systems for international rivers: the Dniester and Prut rivers	NATO	MD, UA, RO	*	*		
Cross-border assessment and management plan for the Drysviaty / Druksiai lake basin	UNEP REC (LT)	BY with LT, LV	*		*	
Cooperative flow and flood management in the upper Pripyat / Dnieper - Bug canal basin	UNEP UNECE OSCE (BY)	BY, UA		*	*	*
Joint research related to activities with transboundary impact in the Danube delta	UNECE	UA, MD, RO		*	*	
Mitigating security risks from sources of pollution and waste						
Mitigating risks from stocks of obsolete pesticides in transboundary basins and near-border areas	NATO OSCE (MD)	MD, BY		*		*
Development of capacities for application of the Espoo Convention	UNECE	BY, UA	*	*		
Mapping and analysis of distribution and flows of radionuclides around the Chernobyl nuclear power plant	NATO	BY with UA	*	*	*	
Strengthening capacities to assess and prevent risks from hazardous activities	UNECE	MD with UA, RO	*	*	*	*

Addressing environmental aspects of security policies						
Assessing environmental implications of energy development policies and trends	UNDP UNEP UNECE	BY, MD, UA	*		*	
Training, awareness raising and institutional support to address environmental effects of defence activities	OSCE (UA)	UA with BY, MD		*	*	
Disposal of stocks of rocket fuel toxic component (melange)	OSCE (UA)	UA	*			*
Integrated approach to areas with overlapping environment-security problems						
Needs assessment, technical, institutional and legal strengthening of environmental cooperation in Transnistria	OSCE UNEP REC	MD	*	*	*	
Environmental assessment of development planning and environment-security monitoring in Crimea	UNDP UNEP	UA	*	*	*	
Assessment and capacity-building for managing environment and security risks in Donbas and Soligorsk regions	UNEP	BY, UA	*	*	*	
Strengthening institutions in the environment and security domain						
Public participation and exchange of information on hydropower development on the Neman and Zap. Dvina rivers	UNEP	BY with LV, LT		*	*	
Prevention of illegal cross-border transport of hazardous waste: training of border and environmental authorities	OSCE (UA) UNEP	UA with BY, MD		*	*	
Development of Moldovan national environmental security programme	UNEP OSCE	MD		*	*	
Awareness, public participation and education on environment and security risks and linkages	UNEP OSCE REC	BY, MD, UA		*	*	

Note: the Work Programme will be continuously adjusted based on emerging needs, completed activities, and available resources.

and developing cooperation. In Crimea ENVSEC will strive to support long-term strengthening of environmental planning and monitoring of the environmental components of security with special focus on more efficient and transparent management of potentially explosive land disputes. And in the socially and environmentally vulnerable industrial areas of Soligorsk (Belarus) and Donbas (Ukraine) the initiative will combine its experience in assessing environment and security risks, exploring options for environmentally sound mining and mine closure, and promoting transparency of environmental activities.

The table presents an overview of first-line activities under the ENVSEC work programme grouped into thematic clusters (shared resources; sources of pollution or waste; environmental aspects of security policies; areas with overlapping environment-security concerns; and overall institutional strengthening). At the same time this classification is still tentative: most projects are designed, in so far as possible, to address several aspects of environment-security interaction simultaneously.

Among the various ENVSEC pillars, capacity-building predictably plays a central role. It is by empowering and enabling countries to fully appreciate and take care of their problems that we can pave the way for lasting and sustainable results. More detailed appraisals will nevertheless be needed for certain areas and thematic issues, whereas for most of the programme's activities the long-term objective is to ultimately improve policies and reduce security risks.

The ENVSEC work programme has so far been based on priorities expressed by the countries through the assessment process, while taking into account the capacities of the initiative's partner agencies and the availability of resources. It also reflects the fact that a large amount of work to address many of the concerns expressed in the report has been carried out or planned by government and non-government bodies in the countries, or through international mechanisms. (Of particular note is the work funded and supported to-date by the European Union, the Global Environment Facility, bilateral donor governments and international organisations permanently present in the countries.) The initiative will therefore give priority to situations in which there are still gaps for which ENVSEC can offer productive ideas and solutions, wherever possible in cooperation and synergy with other players.

But as in other regions, ENVSEC is a dynamic process, trying to react to changing priorities, new opportunities and emerging concerns. The initiative sees this assessment as the beginning of a long road of cooperation and stronger alliances for the benefit of people in Belarus, Moldova and Ukraine along with their neighbours who would all like to live in a cleaner and more secure world.

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Chisinau, 25-26 May 2006

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State Hydrometeorological Service
State Association of Geological Exploration “AgeoM”
National Concern “Apele Moldovei” (“Moldovan Waters”)
Ministry of Healthcare and Social Protection
Ministry of Economy and Trade
Ministry of Finance
Ministry of Industry and Infrastructure
Ministry of Transportation and Road Facilities
Ministry of Agriculture and Food Processing Industry
Ministry of Defence
Ministry of Interior
Agency for Regional Development
National Statistical Office
Academy of Sciences
Institute of Ecology and Geography
Environmental Movement of Moldova
“Eco-Tiras” NGO
“Eco-Spectrum” NGO
Leo Berg Foundation / Pelican NGO
REC Moldova
World Bank / Global Environment Facility project office
EU TACIS project office
OSCE mission to Moldova
UNDP country office in Moldova
Ministry of Environment Protection of Ukraine

Kyiv, 29-30 May 2006

Ministry of Environment Protection
State Environmental Inspectorate
State Committee for Water Management
Ministry of Economy
Ministry for Agricultural Policy
Ministry of Education and Science
Ministry of Defence
Administration of State Border Guard Service
State Nuclear Regulatory Committee
National Security and Defence Council
Kyiv Region State Administration
State Research and Production Centre «Pryroda»
Kyiv-Mohyla Academy
“EcoPravo-Kyiv” NGO
Ukraine Citizen Action Network Project
Centre for Environmental Consulting and Auditing
Ukrainian Centre for Environmental and Water Projects
Office of OSCE project co-ordinator in Ukraine
UNDP office in Simferopol
NATO information centre in Kyiv
Canadian International Development Agency office in Ukraine
Ministry of Foreign Affairs of Belarus
Ministry of Natural Resources and Environment Protection of Belarus

Minsk, 1-2 June 2006

Ministry of Foreign Affairs
Ministry of Natural Resources and Environment Protection
Department of Hydrometeorology
Ministry of Industry / Institute “Belorgstankinprom”
Ministry of Energy
Ministry of Forestry
Ministry of Agriculture and Food
Ministry of Health / Republican Centre of Hygiene
BelNIC “Ekologia” (Research Institute “Ecology”)
State Research Enterprise for Land Management, Geodesy and Cartography “BelNICZem“
Polesskiy Radiation-Ecological Reserve
Academy of Sciences
“Ekopravo” NGO
“Ekodom” NGO
World Bank office in Belarus
EU TACIS office in Belarus
OSCE office in Minsk
UNDP country office in Belarus
UNDP / Global Environment Facility project office
Latvian State Agency for Environmental Assessment
Embassy of the Republic of Latvia in Belarus

Endnotes

[1]The term 'hotspot' in the context of ENVSEC refers to areas where environmental problems may cause considerable security risks and challenges.

[2]ENVSEC publications are available at www.envsec.org/.

[3]For instance in the Southern Caucasus the ENVSEC Initiative has found that population growth and rapid development in big cities result in a combination of environmental and social stresses, which in turn overburden existing institutions and life-support systems and jeopardise the overall regional stability (ENVSEC 2004a).

[4]Examples of such policies include conservation and ecotourism in countryside, introducing and advertising labels for local organic production.

[5]The term «Eastern Europe» as used in Russian terminology earlier, was applied to European socialist countries outside the USSR. (Now these countries are considered to be a part of Central or South-Eastern Europe.) In earlier English terminology the name usually also included the USSR.

[6]For example, at the time of the USSR's collapse Ukraine alone had on its territory over 1,240 nuclear heads, most of which were transferred to Russia with their delivery systems between 1994 and 1996 (Global Security 2006). Belarus became a non-nuclear state in 1996.

[7]Marples (1996) makes this point in relation to Belarus, whereas additional evidence on Ukraine is provided in the respective chapter of this report.

[8]Also known as the Polish-Lithuanian Commonwealth, Republic of the Two Nations, Rzeczpospolita Obojga Narodów in Polish, **Рэч Паспалита абодвух народаў** in Belarusian, **Річ Посполита** in Ukrainian

[9]The **Curzon Line** running through Grodno, Brest, Dorohusk, Kryliv, to the Carpathian Mountains was first designated as Poland's eastern border by the Allied Supreme Council on 8 December 1919. In July 1920 the same line was proposed by the British foreign secretary, Lord Curzon as the border between Poland and Soviet Russia. The Peace Treaty of Riga between Poland and the Soviet republics (1921) gave Poland some 135,000 square kilometres of territory east of the Curzon Line. In 1939 the Curzon Line was accepted as the German-Soviet boundary in the pact between Germany and the USSR. Finally, the Curzon Line was accepted as the Polish-Soviet boundary at the Yalta Conference (February 1945), this time with corrections in favour of Poland (Yakemtchuk 1957).

[10]Some nations neighbouring Eastern Europe named this feature in specific terms, such as the Swedish reference to gränsefolk – "border people" – for Belarusians and Ukrainians (e.g. Abrahamson 2001).

[11]A recent opinion poll about future EU enlargement asked about the possibility of Ukraine becoming a full member by 2020. Only 35% answered favourably. Turkey scored slightly better than Ukraine, with 37% positive responses (see Garcia-Schmidt and Hierlemann 2006).

[12]Of all the countries, Belarus has the longest land border with the EU.

[13]See Kažmierkiewicz et al. (2006). With reference to the Black Sea region Polyakov (2004) writes: "…the last ten years have seen a substantial increase in the role of the […] region as a source and target for new security threats, it is the region's growth as a transit area that is the most threatening, both regionally and globally. At the core of this threat is the growth of transnational criminal networks, which have firmly established themselves within the region, taking advantage of the security vacuum, ethnic conflicts and separatism, weak democracies, and increasing trade. These networks provide the operational capabilities for smuggling arms, drugs, people – whether migrants, young women, or terrorist operatives…"

[14]Azerbaijan and Georgia withdrew from the CIS Collective Security Treaty in 1999. Uzbekistan withdrew from the Treaty in 1999 to join GUAM, but left it in 2006 to rejoin the CIS institution.

[15]Speaking on 17 April 2007 at the Meeting of the UN Security Council, the UN Secretary-General Ban Kimoon said with reference to impact of climate change on peace and security: "This is especially true in vulnerable regions that face multiple stresses at the same time – pre-existing conflict, poverty and unequal access to resources, weak institutions, food insecurity and incidence of diseases such as HIV/AIDS" (UN Department of Public Information 2007).

[16]The ESI seeks to measure a country's ability to "maintain favourable environmental conditions in the future" on the basis of: (1) the state of environmental systems; (2) stresses on those systems; (3) human vulnerability to changes in those systems; (4) capacity to deal with environmental challenges; and (5) participation in the management of the global environmental commons. The ESI is based on 68 variables, including air and water quality, child mortality, and institutionalised corruption. The ESI ranked 142 countries in 2002 and 146 in 2005. All three Eastern European countries are in relatively weak positions on the ESI, though Ukraine stands out as particularly vulnerable. For a discussion of ESI methodology, see www.ciesin.columbia.edu/indicators/ESI/index.html. For a critical analysis of ESI-2002 see Environment Daily No. 1152 (February 6, 2002), available at www.environmentdaily.com.

[17]According to the widely quoted Transparency International's (2007) Corruption Perception Index, Belarus is on the 151st place (out of 163 countries ranked) whereas Moldova is in 79th and Ukraine in 99th position.

[18]The Forum estimates the number of past and future deaths induced by radiation, largely from thyroid cancer, at 4,000 to 10,000; the lower number was communicated more broadly. Given the uncertainty associated with such large-scale multi-factor studies, many commentators note that future studies may strengthen the already existing evidence of wider health effects that include other forms of cancer, genetic effects, immune and cardiovascular diseases. Other studies such as The Other Report on Chernobyl (Farlie and Sumner 2006), estimate the total number

of deaths caused by Chernobyl to be between 30,000 and 60,000.

[19]See Meacher (2005) on connections between the Orange Revolution in Ukraine and the transport of Caspian oil.

[20]Thus between 1998 and 2002 Gazporm subsidies to Belarus are estimated to have been equivalent to $2 billion (Belarus, ECE Energy Series, No. 22, UNECE 2005, page 21).

[21]According to the subsequent complex interim agreement between Kyiv and Moscow, Gazprom sells its gas for $230 a cubic metre to RusUkrEnergo, an intermediary. The Russian gas is then mixed with cheaper gas from Turkmenistan and sold to Ukraine at $95 a cubic metre.

[22]This can be compared with US assistance to Ukraine in 2005 at $174 million. Lieven (2006) quoted by Cheterian (2006).

[23]As a result of the economic difficulties of transition, environmental issues became secondary concerns; the emerging green movements all but collapsed, and ecological issues have been nearly absent from political campaigns. Consequently there has been little debate of the energy choices Eastern Europe must make in the future. Yet in 2006, in an attempt to draw attention to the environmental cost of the nuclear plan, a number of Ukrainian NGOs called for a broad public discussion of future energy options and drafted an alternative concept focusing on energy savings and the development of renewable energy. The report also calls for a revision of the official draft Energy Strategy of sharp reduction of natural gas consumption. See "The Concept of Non-nuclear Development of the Power Industry of Ukraine": www.mama-86.org.ua/files/nnconcept_eng.pdf.

[24]See, for example, material published by national Ministries of Environment Protection on their websites:
- Belarus www.minpriroda.by/,
- Moldova www.cim.moldova.md/raport2004/en/about.htm,
- Ukraine http://menr.gov.ua/, and recent Environmental Performance Reviews by UNECE www.unece.org/env/epr/countriesreviewed.htm

[25]At the same time, EBRD estimates that the Belarusian national accounts overstate real GDP growth by 1-2% (UNECE 2005a). Economic growth may also be partly explained by preferential prices for Russian energy carriers, while refining and reprocessing by-products are sold at market prices (Balmaceda 2006).

[26]In May 2004 the European Commission adopted a "Country Strategy Paper National Indicative Programme" for Belarus, in which it states that "the longterm goals of the EU are that Belarus be a democratic, stable, reliable, and increasingly prosperous partner with which the enlarged EU will share not only common borders, but also a common agenda driven by shared values."

[27]For example, in March 2007 Belarus and Venezuela signed more than twenty documents on economic cooperation, including the energy sector. Belarus is planning to expand its exports to Venezuela and to acquire oil and gas concessions in this country (**КомсомольскаяправдавБеларуси,28марта2007**. http://21.by/papers?id=35312).

[28]In April 2006 after failing to reach agreement on the acquisition of shares in the Belarusian gas transport network, Gazprom announced a three-fold increase in the price of gas imports from 2007 (although in addition to Belarus-owned pipelines, Gazprom transports gas via Belarus through its Yamal-Europe pipeline). This is not the first Russia-Belarus energy dispute since independence. By 1993 Belarus debt for oil and gas had reached $450 million; part of which was cancelled by Russia in 1997. In 1999-2002 accumulated arrears owing to Gazprom amounted to $250 million, and in November 2002 the gas supply was halved. Overall Gazprom's subsidies to Belarus in 1998-2002 due to the difference between preferential tariffs and market prices, and paybacks through low traffic charges, are estimated at $2 billion (UNECE 2005b). At a press-conference on September 29, 2006 President Lukashenko criticised Gazprom's policies (see Newsru.com at www.newsru.com/finance/29sep2006/lukashenko.html). From January 2007, the price of gas was increased from under $50 to over $100 per cubic metre, and Belarus simultaneously sold a 50% stake in Beltransgaz to Gasprom.

[29]The government approved a work plan for constructing a nuclear power plant in June 2006 (see e.g. Telegraf.by of June 22, 2006 at www.telegraf.by/belarus/2006/06/22/aes/), and information on the economic parameters and timeline of the project at http://allminsk.biz/content/view/736/116/).

[30]The Concept (**Беларусь 2001**) is not a public document and was only used in this report through secondary references, such as the National Environmental Action Plan **(Беларусь 2006**) as well as **БелТА** (2006).

[31]Tri-partite cooperation of Belarus, Poland and Ukraine on the Z. Bug river is supported, in particular, by the EU TACIS programme. In 2003-6, the German Federal Ministry of the Environment supported a project to establish an early warning system in the Neman basin and set up a database of industrial facilities in Belarus, Lithuania, and the Kaliningrad region of Russia (see www.neman.iabg.de/index_russ.html.ru.cp-1251 for details).

[32]The greatest floods occur in the central part of Polesie, where rivers the Styr, Pina, Yaselda and Goryn flow into the Pripyat. The water covers 20 km-wide area, and during especially large floods all Pripyat tributaries flow together covering the area spanning up to 50 km. In some years spring floods result in disasters (**Ратанова 2004**).

[33]UN Office in Belarus News 1-8 Nov 2004. http://un.by/news/digest/November2004/1-8-04/UNESCO

[34]Belarus has the Berezinskiy Biosphere Reserve and three national parks: one of the oldest reserved tracts in Europe, Belovezhskaya Pushcha; Braslav Lakes with unique glacial topography; the Pripyatskiy National Park, as well as the Polesskiy Radiation-Ecological Reserve.

[35]Land subsistence even resulted in a 5-ball earthquake in

the town of Pogost in 1998.

[36]See for example information provided by UNDP-Belarus at http://un.by/ru/bulletin/2005-3/belarus/2cf97a162bcf5.html and Soligorsk city government at www.soligorsk.by/ru/info/ssf/health.

[37]In March 2007 more than 100 tonnes of diesel fuel was accidentally spilled from the Unecha-Ventspils pipeline into the Z. Dvina near Bytsevo in the Vitebsk oblast. Oil contamination reached the Latvian territory. The Latvian Ministry of Foreign Affairs announced its intention to demand monetary compensation (**РИА Новости 26.03.07, 30.03.07**).

[38]See www.decomatom.org.ru/rus/news/dec17a.htm; http://bellona.ru/articles_ru/1151329376.58; www.minatom.ru/News/Main/view?id=28084&idChannel=343

[39]See interview with the Latvian Minister of the Environment http://rus.delfi.lv/news/press/vesti/article.php?id=14718682

[40]29% according to the CIA Factbook, 18% according to the Ukrainian statistics (Demydenko 2006).

[41]Throughout 1990s the increase in energy prices fuelled inflationary pressure on the Ukrainian economy. The deteriorating economic situation caused a payments crisis, in which an increasing amount of households and businesses did not pay for energy. In a similar vein the government did not pay its energy bills to Russia, which gave rise to a long, heated dispute between the two countries (UNECE 2004). In early 2006, Gazprom alleged that Ukraine, in addition to not paying the fair market price, had repeatedly exceeded agreed consumption quotas, thus effectively diverting for its own needs part of the gas destined for export to Western Europe.

[42]International Energy Agency press-release 06/16, (www.iea.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=186). See also: "International Energy Agency Calls for Efficiency" // Energy Business Review Online, 24th April 2006 (www.energy-business-review.com/article_news.asp?guid=AA0BE9AD-09A3-42D9-9959-0D22EBE1C8CF).

[43]In 2000 the total water consumption in Crimea was about two cubic kilometres, 75% of which was drawn from the Dnieper through the Northern Crimean channel. Main uses of water include irrigation (67%) and household use (17%). Obviously this makes Crimea very dependent on the reliability of inter-regional water transfer. The Donbas also experiences water shortages. Overall in Ukraine there is about 1,700 cubic metres of annual water flow per capita, but this includes the flow of the Danube that does not play any significant part in providing Ukrainians with water (**Ратанова 2004**).

[44]Those include EU TACIS (promoting collaboration between Ukraine and Moldova to improve water quality and biodiversity), the German Federal Ministry of the Environment (identifying and mitigating risks associated with pollution and industrial accidents as well as establishing early warning systems; see www.dnestrschutz.com/index.html), NATO (installation of automatic water monitoring stations on the Dniester and Prut), UNECE, OSCE and UNEP (legal and institutional aspects of cooperation, and information exchange; see www.dniester.org/).

[45]Some specialists argue, however, that although the channel is needed for the strategic interests of Ukraine, rapid silting of the river would make it too expensive to maintain and, for example, the Ochakiv or Prorva outlets (which belong to less active parts of the delta) would be much more suitable choices for navigation.

[46]Borders in the Azov Sea and the Kerch Strait are still being negotiated between Russia and Ukraine.

[47]See news stories at www.podrobnosti.ua/technoxogies/nature/2006/09/19/349924.html, //proapk.com.ua/apk/2006/09/18/085738.html, www.unian.net/ukr/news/news-166142.html, www.wz.lviv.ua/pages.php?ac=arch&atid=50206, www.zik.com.ua/index.php?news_id=48434, //5tv.com.ua/print/101/56/20483/, //news.uaportal.com/pub/news/93495.

[48]The most significant accidental spill in the Tisza River Basin (TRB) occurred in Baia Mare, on 30 January 2000, when a tailing dam broke due to an overflow. The result was a spill of about 100,000 cubic metres of liquid and slurries containing about 50 to 100 tonnes of cyanide, as well as significant amounts of heavy metals. Another important accidental spill happened in Baia Borsa, Romania, on 10 March 2000, as a consequence of an overflow and breach of the Novat tailings dam. 100,000 cubic metres of sludge with about 20,000 tonnes of solid tailings containing elevated amounts of heavy metals were released into the Viseu River, a tributary of the Tisza River in northern Romania. The causes of the break were design deficiencies, operational shortcomings and unusual weather. On 17 September 2003, a five-kilometre oil slick formed on the Latoritsya River as a result of a Druzhba oil pipeline incident. The amount released was estimated to be vast, given the pumping rate and the pipe's diameter. Moreover, there were no automatic shut-off valves in place. There was a serious risk that oil would get into the Latyrka River, the only source of drinking water for the city of Chop, on the Hungarian-Ukrainian border, and twenty other settlements in the region. Although the spill was largely contained, and downstream nations were little impacted, the treatment of such accidents remains an everpresent concern (ENVSEC 2004b).

[49]See also Prymachenko (2006), **Гопко (2006)**.

[50]In a somewhat similar case, in February 2006 France suspended the decision to send its decommissioned warship Le Clemenceau to India for scrapping (www.indiatogether.org/2006/feb/env-shipretn.htm, www.basel.int/press/pnClemenceau.doc). Ukrainian and Hungarian Ministers of Environment Protection discussed PREMIX incidents during the First Conference of the Parties to the Carpathian Convention. In 2006-7 Ukraine has repeatedly requested Hungary to take the material back (see www.rbc.ua/rus/newsline/2006/12/13/152739.shtml,

www.rbc.ua/rus/top/society/2007/04/19/197804.shtml).

[51]According to World Bank data, "a coal miner in Ukraine produced on average about 100 tonnes of (washed) coal in 1995, the comparable figures were 200 tonnes in Russia, 400 tonnes in Poland, 2,000 tonnes in the United Kingdom, and 4,000 tonnes in North America." (Kupchinsky 2005).

[52]The Novobohdanivka ammunition depot in Southern Ukraine (Melitopol district in the Zaporizhzhia oblast) stored old ammunition and weapons recovered from East Germany after it completed reunification with West Germany in 1990. Some 60% of the ammunition was kept in open stacks and stored as a single body, a technique that is strictly against national regulations designed to prevent accidents. A series of major explosions started on 6 May 2004 and continued for several days, rocking the area around the depot, sending ammunition and shrapnel flying across a 10-kilometre (6-mile) radius and prompting the evacuation of 9,700 people from 15 threatened villages. Explosions have recurred twice since: in June-July 2005 and August 2006 posing a threat to the civil population (with some buildings completely destroyed) and major disruption of trains running to and from Crimea. Unexploded ordnance, projected by the explosions, reportedly contaminated several square kilometres preventing the safe return of the population of evacuated villages (Threat Resolution Ltd, 2004). Natives of the surrounding areas asked the government to award them war veteran status. OSCE currently provides support to the government for the collection of unexploded ordnance.

[53]Country background information is partly based on UNDP's 2006 Human Development Report (UNDP 2006b).

[54]Hereinafter, this refers to the Transnistrian region of the Republic of Moldova.

[55]There has been much speculation that Transnistria produces and trades weapons, but not much solid evidence has been presented (see http://pridnestrovie.net/armsinspectors.html; www.jamestown.org/edm/article.php?volume_id=407&issue_id=3456&article_id=2370213; www.andy-moore.co.uk/index.php?id=53; www.tiraspoltimes.com/node/132). At the same time Tiraspol has consistently refused international inspections of its military enterprises.

[56]see e.g. "Moldova scraps Romanian consulates" // BBC News, March 15, 2007 (//news.bbc.co.uk/2/hi/europe/6454841.stm); "Moldova: What's Behind Harsch Criticism of Romania?" // RFE/RL March 19, 2007 (www.rferl.org/featuresarticle/2007/03/5eab769bbc08-416b-9eea-308336107aaa.html).

[57]At the same time, according to the 1989 census the population of the Transnistrian region consisted of 40% Moldovans, 30% Ukrainians and 30% Russians, and the majority of the Russians in the Republic of Moldova live in Chisinau and on the right bank of the Dniester river rather than in the Transnistrian region.

[58]Chisinau sees this as proof of the political nature of the ban. As of April 2007, wine exports have not resumed ("Moldova: Counting Losses as Russian Wine Ban Lingers" // RFE/RL, April 4, 2007, www.rferl.org/featuresarticle/2007/4/AF0610F8-0D72-4EB7-BFC0-008BC39328DE.html).

[59]See //eubam.org for further details.

[60]Transboundary Cooperation in the Dniester River basin: www.dniester.org/

[61]Details at www.dnestrschutz.com/index.html

[62]For example, when in December 2005 the Sivka, a Dniester tributary in Ukraine, was contaminated by calcium hypochloride, the Moldovan government was not immediately notified and only obtained information about the incident after submitting an official request.

[63]According to de-facto local authorities in the Transnistrian region of Moldova.

[64]According to the Moldovan Academy of Science, in case of an explosion at the Cobasna depot a primary shock wave will travel at least 40 to 50 kilometres. The scale of destruction would be comparable to a magnitude-7 earthquake. The population would be affected in an area of 500 to 3,000 square kilometres, covering nearby towns of Ribnita, Haraba, Varancau, Slobodka (in Ukraine) as well as remote parts of Moldova, Ukraine and Romania (REGNUM news agency, www.regnum.ru/news/482231.html). Some analysts however believe that the potential damage would be much less since simultaneous detonation of all the material at the base is unlikely.

[65]Environmental aspects of security in the Transnistrian region of Moldova are also addressed by documents passed by de-facto local authorities on environmental protection, environmental security (1994), and the management of industrial and household waste (2006).

[66]See for example Przeworski (1991, 1995) and McFaul (2001) who both argue that radical economic effects are likely to upset political balance and make transition to democracy impossible.

Abbreviations and notes

Abbreviations

CIA	Central Intelligence Agency
CIS	Commonwealth of Independent States
DDT	Dichloro-Diphenyl-Trichloroethane
EBRD	European Bank for Reconstruction and Development
ENP	European Neighbourhood Policy
ENVSEC	Environment and Security initiative
EU	European Union
GDN	Gross Domestic Income
GDP	Gross Domestic Product
GEF	Global Environment Facility
GRES	State district power plant (from Russian: **ГРЭС - Государственная районная электростанция)**
HIV/ AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
ICPDR	International Commission for the Protection of the Danube River
IEA	International Energy Agency
IAEA	International Atomic Energy Agency
IMF	International Monetary Foundation
JRMP	Joint River Management Program
LLRW	Low Lever Radioactive Waste
MOE	Ministry of Environment Protection
MFA	Ministry of Foreign Affairs
NATO	North Atlantic Treaty Organization
NPP	Nuclear Power Plant
OSCE	Organisation for Security and Co-operation in Europe
PPP	Purchasing Power Parity
REC	Regional Environmental Center for Central and Eastern Europe
RFE/RK	Radio Free Europe / Radio Liberty
TACIS	Technical Assistance to Commonwealth of Independent States
TOE	Tonne of Oil Equivalent
UNAIDS	United Nations Programme on HIV/AIDS
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNESCO	United Nations Education, Science and Culture Organization
UNICEF	United Nations Children's Fund
UNPD	United Nations Population Division
USSR	Union of Soviet Socialist Republics
WTO	World Trade Organization
Z.	"Western" in names of rivers (from Russian: **западный**, **-ая**; Ukrainian: **західний**, **-а**)

Stamps as messengers

Small postal stamps can send strong messages, powerful reflections of the history, everyday life, worries and aspirations of countries and people.

As the American environmental researcher Michael Glantz writes in “Stamping our environmental disaster” (Poverty and Environment Times, March 2004), often enough “stamps that deal with the natural environment present only the prettiest side of nature: national parks, butterflies, birds, fish... There are very few examples of exceptions, but a few do exist. During a trip to Moscow, I came across two stamps that focused on environmental problems. One was a Chernobyl stamp printed in the late 1980s. Another was an ecology stamp that portrayed the drying up of the Aral Sea... To put these issues in front of the public on a daily basis, in a medium that many of us collect … could help to educate the public and policy-makers on the fragility of the Earth”.

Stamps from Belarus, Moldova and Ukraine, vividly illustrating the countries’ environment and other sides of life, make their contribution.